

IMPACT OF FINANCIAL REFORMS ON FIRM'S INVESTMENT FROM EMERGING COUNTRIES

Abubakr Saeed

**Submitted in partial fulfilment of the requirement for the degree of
Master of Philosophy**



**Brunel Business School,
Brunel University, Uxbridge, United Kingdom**

April 2012

ABSTRACT

The understanding the effects of financial reforms on financial constraints and firm investment is an important issue from both microeconomics and macroeconomics perspectives. This study empirically investigates the impact of financial reforms introduced in the 90s have succeeded in relaxing financial constraints to investment. The analysis is mainly based on the cross-industries panel of 501 Indian and Chinese non-financial large firms for the period from 2000 to 2009.

By applying an Euler investment model, we examine the whether financial reforms have relaxed the constraints faced by firms for domestic and foreign investment decision. In particular, impact of financial reforms is measured through two ways: credit supply and foreign listing. Results find that firms are financially constrained in their investment decision. Intensity of financial constraints to investment is higher for Indian firms. Firms from both economies face financial constraints to their domestic as well as foreign investment. Further, results show that financial constraints to overall investment in Indian market decreases with business group affiliation, while state-ownership is beneficial for Chinese firms to overcome market imperfections. Similar pattern emerges for corporate domestic and foreign investment decisions in both countries. However, affiliation to business groups does not have any effect on financial constraints to foreign investment in Indian market.

Next, the empirical results show that positive impact of financial reforms in terms of credit supply. In both markets, financial constraints to overall investment decreased due to improved supply of funds. The positive effect of reforms in terms of credit supply remains consistent for domestic and foreign investment. The magnitude of coefficient indicates intensity of financial constraints to investment at certain extent. In contrast, Indian large firms are not financially constrained. The impact of financial reforms is significant in Indian financial market, representing that financial policies targeting the credit excessive supply are

more successful in India. However, econometric results are not supportive to the positive role of foreign listing in mitigating financial constraints. Financial policies assisting firms to foreign list do not seem to have had much effect on the financial constraints to domestic or foreign investment decision in either market.

ACKNOWLEDGEMENT

I would like to express my profound gratitude and sincere thanks to my supervisor Professor Suma Athreye for her encouragement, support and guidance throughout the preparation of this thesis.

Table of Contents

Chapter 1: Introduction	1
1.1. Background of study	1
1.2. Aims and objectives	2
1.3. Structure of the thesis	3
Chapter 2: Literature Review of Financial Constraints and Investment	5
2.1. Introduction	5
2.2. Capital market imperfection	5
2.3. Theory of financial hierarchy	10
2.4. Business group affiliation and state-ownership	13
2.5. Empirical evidences on financial constraints and investment relationship	16
2.6. Foreign investment	19
2.7. Conclusion	22
Chapter 3: Empirical methodology and data description	24
3.2. Structural models of firm investment based on the Euler equation	27
3.5. Dataset used in estimations	36
Chapter 4: Findings and Discussion	41
Chapter 5: Conclusion	51
6.1. Concluding remarks	51
References	55
Appendix	62

Table of Tables

Table 3.1: Variable construction.....	40
Table 4.1: Mean values of variables across countries.....	42
Table 4.2: GMM-IV estimation results for total investment	46
Table 4.3: GMM-IV estimation results for domestic investment	47
Table 4.4: GMM-IV estimation results for foreign investment.....	49

Chapter 1: Introduction

This chapter provides an overview of the framework of the thesis. It begins with a short background of the topic. It also provides the aims and objectives of this research. Following aims and objectives, the chapter provides the overview of the structure of the thesis.

1.1. Background of study

Investment decisions of firms occupy a prominent place in research discussion of economy's long-term growth and business cycle fluctuations. This debate has been driven both by theoretical concerns and policy questions. The mutual aim is to understand the mechanisms that determine investment spending.

Over the last few decades, literature concerning business investment has rotated around few theories in attempt to explain factors behind corporate financing policy. Pioneering work of Modigliani and Miller (1958) suggested that market value of any firm and its cost of capital are independent of its investment decisions providing that there are no transaction cost, information asymmetry, taxes and bankruptcy cost.

Perusing through more than forty years since then, researchers have attempted to expand the irrelevancy proposition to relax underlying assumptions to incorporate the role of financial constraints. Studies such as Opler et al., (1999); Myers and Majluf (1984); Myers (1984); Ross (1977); and Baxter (1967) have been guided by the MM propositions, attempt to relax assumptions by mostly relying on the arguments that asymmetric information and problems of contract enforcement lead to the emergence of information costs, thereby driving a wedge between the cost of external and internal finance. Therefore, the investment decisions of firms operating in such environments are sensitive to the availability of internal funds because they possess a cost advantage over external funds.

In order to overcome such information-related capital market imperfections; several economies have initiated financial market reforms in last two decades. At the firm level, the main objective of these reforms was to increase the supply and improve the allocation of funds for investment. In academia these reforms have spurred an interest in the effects of financial reforms at both firm and country level. Though intense empirical analysis at the macroeconomic level has undertaken but empirical work using microeconomic data is still scarce and no professional consensus on the net benefits of financial reforms has achieved. The existing studies at firm level offer mixed results. Studies have shown that financial reforms can be destabilizing, since it leads to excessive lending through credit expansion programs (Aghion et al. 2004). Moreover, empirical work examining the impact of reforms on firm's foreign investment that is a foremost driver of current economic growth of emerging economies is virtually non-existent. Clearly, there is a need to analyse the targeted benefits of financial reforms on overall investment in general and foreign investment in particular.

1.2. Aims and objectives

Emerging economies have experienced extraordinary growth in the past twenty years. Since the economic reforms initiated in the start of 1990, leading emerging economies, India and China, have achieved an average of nearly double digit growth rates in the last two decades. As part of the process to mitigate the imperfections in financial market, these economies underwent significant measures in liberalizing their financial sector. These reforms have encompassed a large number of areas including; removing the barriers to entry in the banking sector to promote finance penetration in the market, improving the bank's screening capabilities to mitigate information asymmetry issues, dismantling the credit controls and development of security and financial markets to reduce the cost of external financing.

Although the main objective of such financial reforms has been to enhance the supply of funds through reducing the cost of external finance and mitigate the constraints on the supply of funds for both domestic and foreign investment, however, the consequences of such reforms on the ease of finance to firm investment is not well established. Therefore, the aim of this study is to investigate whether the financial reforms have reduced the financial constraints to firm investment decision through better allocation of funds and foreign listing. In particular, study examines the impact of financial reforms on firm domestic as well as foreign investment in Indian and Chinese market.

In this dissertation, the approach that is followed differs from existing related studies in two perspectives. First, Euler investment model is developed while considering the theoretical motivations and the institutional factors of both economies. Second, the model is tested with the foreign as well as domestic investment of 501 non-financial large multinational Indian and Chinese firms for the period 2001-2009.

1.3. Structure of the thesis

In chapter 2, the literature review on financial constraints and investment as a background of the empirical study of this thesis is presented. First, the concept of capital market imperfection is explained. It is followed by the theory of financing hierarchy. The impacts of business group affiliation and state-ownership are discussed in the following section. Next, the nexus between investment and financial constraints is presented. Finally, the financial constraints to foreign investments are discussed in the last section.

Chapter 3 discusses the empirical methodology and dataset of the thesis. First, methodological framework is developed. Next, econometric issues in estimation are presented. The latter half of this chapter discusses the variables and the respective definitions

that this research employs. It explains how the dataset is built through presenting the sample selection criteria.

Chapter 4 attempts to answer the main question of the research. In particular, first, it tests and discusses the impact of financial reforms on financial constraints to firm overall investment decision then domestic and foreign investment decision. Finally, chapter 5 concludes the thesis by providing the summary of the findings of the thesis. Moreover, some thoughts of future research are also discussed.

Chapter 2: Literature Review of Financial Constraints and Investment

2.1. Introduction

The current chapter presents a comprehensive theoretical background and critically evaluates the extent of the empirical literature over the financial constraints and investment themes. Chapter begins with the model inspired by Modigliani and Miller (1958) and subsequent corporate income tax model Modigliani and Miller (1963) and personal income tax model Miller (1977). The later part of this section discusses the impact of financial reforms on firm financial constraints. This is followed by the foundation theory of financial hierarchy in section 2.3. Section 2.4 examines the impact of business group affiliation and state-ownership on corporate access to external finance. Section 2.5 discusses the studies using firm-level data to investigate the relationship between financial constraints and investment. Finally, section 2.6 sets up some conclusions.

2.2. Capital market imperfection

The modern finance theories originating from the firm's market value maximization principle embodies in the initial proposition of Modigliani and Miller (1958). Under this proposition, a firm's financial policy is irrelevant to its value. Specifically, it asserts that cost of capital and hence value of the firm is irrelevant of its choice of finance. In this case internal finance is considered as perfect substitute of external finance. Since firm in a perfect world of Modigliani and Miller (MM henceforth) operates without financial frictions, which means there does not involve transaction cost, taxes, and imperfect information; therefore, value of levered firm is equal to the value of un-levered firm.

At the start though, MM initial proposition was considered for a firm's debt-equity choices but the applications of proposition have since the expanded to firm's all financial policies. Five years after instituting this irrelevance proposition, MM (1963) incorporated the

importance of taxes for the irrelevance of debt-equity choice. The results immensely overturn the claims of the earlier prediction. On this account they recognise the corporate tax advantages of debt to their model of corporate valuation, under which the value of the levered firm becomes sensitive to capital structure. Accordingly, value of firm will be at its maximum level with 100 percent utilization of debt. At this point, the discussion on the theoretical predictions of capital structure is either irrelevant when the market is perfect (MM, 1958), or set at its maximum prediction with the inclusion of corporate income tax in the otherwise perfect market (MM, 1963). However, neither proposition reflects the objective reality of the world. In fact, the second proposition raised the further provocative investigation- whether firm that issues equity leaves return their money in the form of unnecessary corporate income tax payments?

Fourteen years later, Miller (1977) resolved this issue by adding personal taxes to the existing corporate tax correction valuation model. The crux of the argument is that with personal taxes there is no corporate advantage to leverage; so, interest tax gains on debt have little or no value for most firms. Under this prediction, higher taxes on interest payments than on dividends eliminate the debt associated advantage to the firm. After incorporating corporate and personal taxes, debt were cheaper than equity on a risk adjusted basis, firm would switch into debt and thus would try to stick with it up to the point where it ceased to be cheaper.

These controversial propositions have stimulated researchers to keep adding real world's elements in quest of how theoretical predictions change accordingly. Issues such as financial distress costs, transaction costs, agency issues and taxes are related to the elements of real world which have effect on firm investment. Subsequent theoretical work, thus, concentrate on these factors associated with market imperfections and their impacts on the firm investment. Importantly, contemporary research work has appeal to the problem of asymmetric information that rests in the centre of market imperfection.

Firm managers or insiders are assumed to have more information about operations and future prospects than outside investors, which creates the problem of information asymmetry. Information asymmetry between insiders of the firm and less-informed outsiders is a vital element of the real world which was missing in the underlying assumptions of the MM first proposition. Jensen and Meckling (1976) argue that superior information of insiders may resulted in to moral hazard problem in which managers can use funds on excessively risky projects. In order to compensate this potential risk, lender demands a premium for the debt and most likely use covenants to limit the fund utilization in specific projects. To certain extreme, Stiglitz and Weiss (1981) predict that owing to information asymmetries lender cannot discriminate between good and bad borrower which lead to credit rationing in the credit market.

Despite the fact that studies are providing various implications of information asymmetric problem, the basic underlying assumption is that internal funds are no longer substitute for external finance because of cost wedge between these two sources. This gap is positively associated with the degree of market imperfection which leads to an information cost (Harris et al., 1994). Firms with higher information asymmetry tend to face higher cost for external finance than firms with low level of information asymmetry. Thus, it is reasonable to believe that capital markets are imperfect, and MM propositions no longer stands.

Though the issue of financial constraints concerns all markets around the globe but is more pertinent to developing countries. Therefore, in order to overcome market financial frictions, since the beginning of 90's several developing countries have initiated financial reforms process. The financial reforms process has been characterised by greater scope granted to market forces in the determination of interest rates and the supply of credit (Galindo et al., 2007). Various reforms policies, such as, improving the bank's screening capabilities to mitigate information asymmetry issues in the capital market, development of security and

financial markets to reduce the cost of external financing, and removing the barriers to entry in the banking sector to promote finance penetration in the market, were introduced in this regard. Moreover, removal of credit ceiling and administrative controls on interest rate; and scaling down of credit programs were also found to be vital elements of the reforms (Laeven, 2003).

There is some international evidence of positive effects of reforms on firm financial constraints, however overall results are ambiguous. On the one hand, it is thought that financial reforms generate efficiency gains through increased financial intermediation by the formal financial sector. Owing to economies of scale in information gathering and monitoring, banks and financial institutes are expected to allocate investment funds at reduced cost (Laeven, 2003). On the other hand, it has been seen that financial liberalization has failed to achieve the expected outcomes, because it accompanies a general rise in interest rate which raises the cost of capital; and elimination of subsidized credit programs which increase the financial constraints of substantial class of borrowers (Gertler and Rose, 1994).

From the empirical standpoint, there are abundant empirical studies discussing financial reforms efficiency for the allocation of funds. In a cross-country analysis, Bekaert and Harvey (2000); and Henry (2000) find reduction in cost of capital after capital market liberalization in emerging markets. Wurgler (2000) also finds that rate at which resources are allocated to firms in productive industries depends on the development of financial system. He observes that informationally efficient secondary market prices, firm private ownership, and minority investor's right are associated with better capital allocation. Harris *et al.*, (1994) report favourable effects of financial reforms on relocation of domestic credit, resulting in improved firm investment. They further observe this effect on firm size categories and report that capital relocation is more centred to smaller firms, while large firms are able to substitute expensive domestic finance with cheaper foreign finance which helped to release some

domestic credit to financial deprived firms. Fisman and Love (2003) estimated the financial development and growth relationship for 37 industries in 42 countries, during the period 1980 to 1990. After measuring the level of development as domestic credit provided by private sector banking industries, it is suggested that financial markets playing an important role in allowing firms to take advantage of global growth opportunities. They further observe that firms in industries that depend more on trade credit exhibit higher rates of growth in economies with weaker financial institutions and legal systems.

Several studies have recently examined the issue of outcomes of financial reforms in a single emerging country context and found the mixed results. Gallego and Loayza (2000) suggest that reforms eased the financial constraints during the period of deregulation for Chilean firms. Investigating the impact of liberalization in Indonesian economy, Harris et al., (1994) find that reform has increased the borrowing costs affecting the investment to liquidity. Similar results are also obtained by Siregar (1992) for Indonesian establishments. He observes an increase in the flow of funds to more efficient firms after liberalization. Ghosh (2006) investigates the impact of financial liberalization on firm's investment behaviour in Indian market. Using Panel data of over 1000 firms for the period 1995 to 2004, he finds that financial liberalization improves the access of external finance to financially constrained firms. This ease was more pronounced for small firms. In the similar country study, Bhaduri (2005) reveals contradictory evidence on the impact of financial linearization. He shows that small and young firms experience an increase in financial constraints in post liberalization period.

Using dataset of 3199 Mexican manufacturing establishments, from 1984-1994, Gelos and Werner (2002) report that financial reforms in Mexico have only benefited to small firms in easing financial constraints. Their results show that financial reforms could not translate into a reduction in the premium of the cost of external finance but rather into an increase in the

number of firms that were potentially eligible for debt. They attribute these findings to poor evaluation system of banks and collateral based lending strategies. Contrary to this finding, Jaramillo et *al.*, (1997) report that financial reforms in Ecuadorian market do not have had any effect on the severity of financial constraints to small firm investment. The continuing presence of informational imperfections, inefficient resource allocation to promote cheap credit for small firms following reforms is part of explanation.

Laeven (2002) examines the impact of change in government policy of the financial constraints of different types of Korean firms. Using data on 198 Korean firms for the period 1991 to 1997, he finds that change in policy brought positive effects for SMEs in the sense that it has reduced financing constraints to them. In a similar study, Kong (1998) uses data on 171 listed manufacturing firms for the period 1981-1989 and tries to assess financing constraints. He observes that investment-cash flow sensitivity is lower for non-chaebol firms after the opening of the capital market in 1986. On the other hand, Borensztein and Lee (1999) provide evidence of inefficient credit allocation after credit market opening in Korea and show that credit was allocated preferentially to the sectors with the worst economic performances.

Although these studies provide useful insights on some of the consequences of financial development or of financial reform in different countries, but these empirical findings to date about the effects of financial reforms on financing constraints in developing countries has been inconclusive. Therefore, whether financial reforms relax financial constraints faced by firms in obtaining external funds is ultimately an empirical question.

2.3. Theory of financial hierarchy

Resting on the notion of imperfect capital market, a firm with information asymmetric problem may only be able to access external finance on less favourable terms. Consequently,

firm has an advantage in using internal finance over external funds. This is the main theme of “financing hierarchy theory” or “pecking order theory”. According to pecking order rule firm follows the hierarchy while financing the investment. The idea of financing hierarchy originates from the pioneering work of Donaldson (1961), but Mayers and Majluf (1984) present a clear theoretical rationale on the issue. They argue that if firm finances new investment by issuing underpriced equity, wealth would be transferred from existing shareholders to new investors. Therefore, managers tend to reject the investment regardless of its positive NPV. Here, Mayers and Majluf suggest that this situation can be avoided if source of finance are switched to financial sources which are less susceptible to underinvestment, such as retained earnings or debt. It can be inferred that in such circumstances, internal funds and debt would be preferred to equity.

There are formally four predictions about firm financing behaviour of this pecking order theory (Mayers and Majluf, 1984). First, dividend is considered as “sticky” and firms adjust their target dividend payout ratios to their investment opportunities. Second, firm prefer internal finance over external finance. Third, if firm must obtain external capital, firm will resort to the security and eventually progressing through risky finance. They have to start with debt, then hybrid securities and finally equity will be the last resort.

This hierarchy or strict ordering can be explained mainly by the cost associated with each financing source which is related to the magnitude of information asymmetry. From the investor’s point of view, internal capital generally poses no information asymmetry problems. The issuance of debt can cause minor frictions which appear as conflict between managers and debt holders, while the issuance of equity is subject to serious information frictions, and can appears as conflict between debt holders and equityholders.

The noteworthy aspect of this theory is the inclusion of cost of external finance in corporate financing choice. Further, it puts forward a motive for holding cash since external sources should be avoided and there is no optimal level of cash holdings because it is assumed that there is no optimal level of debt. Cash balances are simply the outcome of the financing choices of firm as proposed by Myers and Majluf's (1984) hierarchical model. Therefore, when firm's resources are adequate and surpass the amount required for investment, the firm will pay dividend, otherwise retain cash (Opler et al., 1999; Dittmar et al., 2003).

In essence, there are three seminal documented views supporting the financing hierarchy. The first view, proposed by Donaldson (1961), suggests that strict hierarchy of financial sources is the way of management to evade market monitoring. The second view by Myers (1984) claims that financing hierarchy is the device to minimise transaction costs of financial sources. The third view initiated by Myers (1984) and Myers and Majluf (1984) suggest that financing hierarchy is aimed to reduce information asymmetry between firms and outside investors. The notion of information asymmetry is in line with the signalling argument forwarded by Ross (1977) and Leland and Pyle (1977).

From the financial reforms perspective, as the reforms are thought to reduce the imperfections in credit market, resulting in a reduction in the cost of formal finance and an increase in the level supply of credit. The availability of credit from the market in reformed market enables firms to utilize more external credit and be less dependent on internal capital. Using a firm level sample of 40 countries, Love (2003) finds that firms' dependence on internal capital is lower in economies equipped with well-developed financial system. He concludes that financial development mitigates the financial constraints; thereby firms have access to credit market. Moreover, Leaven (2003) report that reduction in financing constraints following reforms is likely to have more effect for small firms. He finds that, in a

sample of 13 developing economies for the period 1988 to 1998, dependence on internal capital following the banking sector deregulation significantly decreased for small firms.

In a cross-country study of 43 countries during the period between 1980 and 1990, Rajan and Zingales (1998) investigate how external finance affects growth of firm and ultimately industry. They report that firms in industries (i.e. Drugs and Pharmaceuticals) that are technologically more dependent on external finance for their investment grow considerably faster following the liberalization. Further, they decompose the growth pattern into new and old establishments. As young firms are more likely depend more on external finance than old firms, so the growth of the young establishments is more sensitive to financial development. In a closer study, Gupta and Yuan (2009) examine the effects of stock market liberalization on cost of external finance by using a sample of 31 countries between 1981 and 1998. Their finding strengthens the previous results (Fisman and Love, 2003; Rajan and Zingales, 1998) that liberalization promotes economic growth by lowering the cost of external finance and this effect is more pronounced in industries that are more dependent on external financing. On the other hand, they contradict with Rajan and Zingales (1998) and offer evidence that new firms are likely to be more financially constrained and depends more on internal capital following the liberalization. They contributed this result to the institutional and regulatory level entry barriers in countries that allocate capital less efficiently.

2.4. Business group affiliation and state-ownership

As it is discussed earlier, the inefficient financial system makes it more onerous for firms to access formal finance (La Porta et al., 1997). In an environment where institutional efforts to mitigate such market frictions are not sufficient, firms are often organized into business groups, which become a collection of independent firms from various industries that are connected either formally or informally. Prior research on groups has discussed their role in

risk sharing among group member firms (Khanna and Yafeh, 2005) and in facilitating member firms overcome financial impediments to external finance (Hoshi et al., 1991).

The role of business group in mitigating capital market imperfections is initially studied by Leff (1976). In his research he shows that group structure offers a system for pooling and distributing resources among the member firms. Moreover, the diversification increases the flow of information within the group and thereby reduces the risk. Leff further argues that group structure provides an internal capital market that mobilises the available resources to group. Owing to these characteristics, business groups maintain superior access to external resources. This access is obtained mainly through holding large size of corporate shares that entitle them to scoop large proportion of firm profits which provide them monopolistic power within the market. Therefore according to Leff the business groups perform the function of a capital market for member firms. This view is regarded as market failure theory. The application of business group is more prevalent in developing countries where capital market is distorted and firms are unable to overcome the market frictions by themselves.

The benefits from diversification within business groups is also the subject of Khanna and Palepu (2000), who used Chile as empirical setting and observed the structure and financial policies of groups affiliates over the period 1988 to 1996. Specifically, their research work seeks to distinguish between benefits that are due to affiliation with a diversified group, and benefits from group affiliation that is non-diversification related. Results show that benefits related to diversifications to group affiliates might be due to the social links between member firms. Such links decrease transaction costs by encouraging information distribution amongst group firms, and by offering cost effective strategies for resolving disputes and contracting problems. Similarly, Khanna and Yafeh (2005) report that Indian business groups use intra-group loans to smooth liquidity among the member firms and their investment is less constrained to the availability of external finance.

The inability of financial institutions to overcome the financial markets impediments leads firms to prefer having state-ownership. State-owned firms are typically characterized by soft budget constraints, as the main function of these firms is not to maximize profit, but rather to maintain the social stability (Guariglia, 2008). In particular, as mentioned in Bai et al. (2006), the main task of these firms is to maintain the employment of surplus workers and to guarantee their welfare. The government has therefore an incentive to keep these firms alive. To do so, government provides them with large amount of credit. Therefore, market frictions generating financial constraints are not the problem of these firms.

State-owned firms are considered as less risky than their private counterparts in the credit market. In the event of SOEs failing to repay their loan, lending institutions believe that the government will bail them out, and it is typically politically acceptable to lend to SOEs. In addition, it is more cost effective for lenders to give loan to SOEs than to private firms. Empirical evidence of this phenomenon is echoed in Dollar and Wei (2007), who report that state-owned firms have significantly lower returns to capital than private firms in Chinese capital market, indicating that favourable treatment of state-owned firms in the credit market. Similarly, Liu and Siu (2006) provide evidence that the cost of capital for state-owned firms is lower than for private firms in China.

In the similar vein, Manova et al., (2009) show that state-owned firms in China are more immune to credit constraints since they enjoy preferential treatment and substantially easier access to financing, particularly from state-owned banks. Therefore, state-owned firms have an advantage over domestic firms in overcoming binding credit constraints on their investment, which will manifest in firms' investments. Moreover, this advantage is found more pronounced in sectors characterized by particularly high upfront costs and limited tangible assets.

Taken together, business group affiliation and state-ownership facilitate firms in mitigating financial constraints by providing preferential access to external financial resources. Graphically, the impact of group affiliation and state-ownership is represented in figure 1.

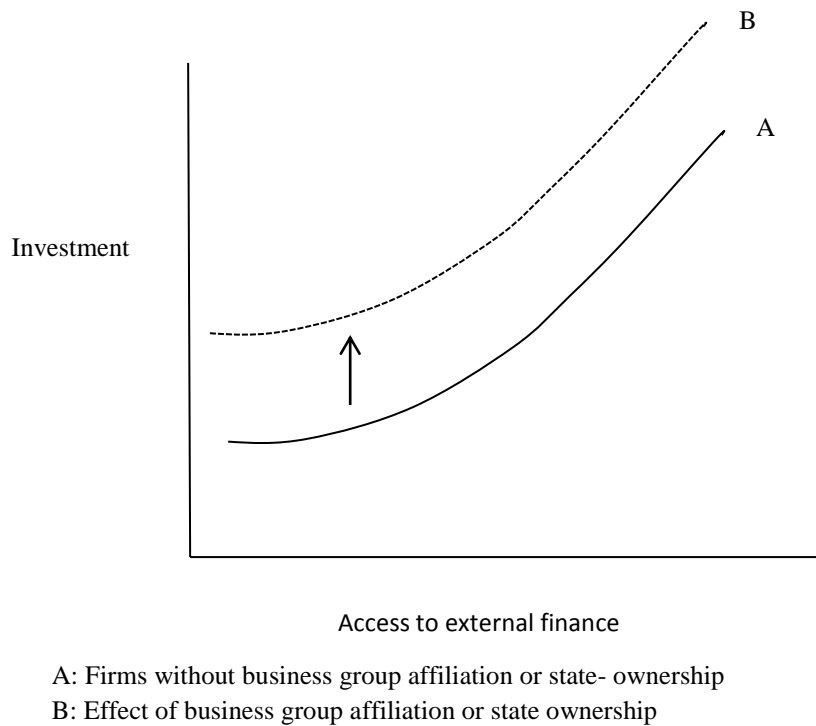


Figure 1: Impact of group affiliation or state-ownership on access of external finance

Empirically, it is of great importance to test this conjecture that firms belonging to a corporate group or having state-ownership are less subject to financial constraints in the credit market than standalone or private firms.

2.5. Empirical evidences on financial constraints and investment relationship

A firm is considered as financially constrained if the cost or availability of external finance precludes the firm from making an investment it would have chosen to make had internal funds been available (Cleary, 1999). Since the seminal work of Fazzari *et al.*, (1988), a large and growing body of literature aims to provide evidence of financial constraints a might face

in the capital market. Most studies rely on the sensitivity of internal funds (mainly, retained earnings) to the investment spending as a mechanism to measure the severity of financial constraints.

In order to measure the financial constraints in a panel of 422 large U.S manufacturing firms over the 1970 to 1984 time period, Fazzari *et al.*, (1988) empirically test the relationship between investment spending and internal funds. They argue that firms with higher retention ratios face higher informational asymmetry problems and are more likely to be liquidity constrained. They classified the sample using a priori classification of firm's financing constraints, such as dividend pay-out ratio, and compare the investment-cash flow sensitivities of these sub-samples. They report that sub-sample classified as financially constrained (one having low dividend pay-out ratio) possess higher investment-liquidity sensitivity. Higher sensitivity for the samples of a priori more constrained classified firms is interpreted as evidence of tighter financing constraints. Following their work, now it has become a standard research methodology to investigate the disparity in sensitivities of investment to cash flow between a priori segmented firms.

Subsequent studies have confirmed the central result of Fazzari *et al.* by showing that the investment-cash flow sensitivity is higher for firms that have a high 'susceptibility' to capital market imperfections. Hoshi *et al.* (1991) find that investment is more sensitive to cash flow among 24 Japanese manufacturing firms that are not members of a keiretsu (having no bank relationship) than that of 121 firms that are members of a keiretsu (bank-group affiliated) and are presumed to be less financially constrained. Oliner and Rudebusch (1992) study 99 NYSE-listed and 21 over-the-counter firms over the 1977 to 1983 period and conclude that investment-liquidity sensitivity is higher for firms that are young, whose stocks are traded over-the-counter, and that exhibit insider trading behaviour consistent with privately held

information. Schaller (1993) examines 212 Canadian firms during the 1973 to 1986 period. He reports that investment for young and independent firms is more sensitive to cash flow.

Using a panel of small U.S firms for the period 1980-1992, Carpenter and Petersen (2002) find that though these firms experience higher growth rate but cash flow sensitivity to their investment is higher which means these firms are more financial constrained. Similar results are reported on a sample of Italian firms in Becchetti and Trovato (2002); and Fagiolo and Luzzi (2006). In particular, they find that availability of external finance negatively affects to the growth of Italian small firms and exhibit higher investment-cash flow sensitivity. Whited (1992); and Bond and Meghir (1994) using a sample of 325 U.S manufacturing firms and unbalanced panel of 626 U.K firm, respectively, confirm the Fazzari et al. result and find the financial constraints to be particularly binding for the constrained groups of firms.

On the other hand, several studies question the validity of this interpretation. Importantly, work done by Kaplan and Zingales (1997) fuelled this debate. They challenge the generality of conclusions achieved by Fazzari et al., and classify firms based on quantitative and qualitative information retrieved from firm annual reports. They classified firms as financially constrained if a firm is in violation of debt covenants, renegotiating debt payments, or forced to reduce investment because of liquidity issues. Contrary to previous findings, they show that investment decision of firms having most information asymmetry exhibit least sensitivity to cash flow. That is interpreted as investments of least financial constrained firms are the most sensitive to the cash flow. This contradictory result is also supported by several empirical studies. For example, Cleary (1999) provides strong support for results in Kaplan and Zingales by using diversified sample of large 1,317 U.S firms and reports that more creditworthy firms exhibit greater investment-cash flow sensitivity than those classified as less creditworthy. Gilchrist and Himmelberg (1995) provided the similar evidence that large U.S firms with higher pay-out ratios exhibit higher investment-cash flow

sensitivity. Similarly, Kadapakkam *et al.*, (1998) support this notion by providing evidence from six OECD countries, over the period of nine years, that larger firms are more cash flow sensitive than their small counterparts. Cleary (1999) reports higher cash flow sensitivity for firms with stronger financial positions are than those that are less credit creditworthy in the market. In the similar vein, Audretsch and Elston (2002) show that medium sized German firms are financial constrained than either the small or the large firms.

In response to this growing controversy, few studies; namely, Almeida *et al.* (2004) and Khurana *et al.* (2006) tried to implement a new metric; cash- cash flow sensitivity rather investment-cash flow sensitivity to measure financial constraints. The interpretation remained similar; cash-cash flow sensitivity would be higher for financially constrained firms. Almeida *et al.* argue that using financial variable rather a real variable makes this measure less susceptible to uncontrollable variables, i.e. unknown future growth opportunities. Besides efforts inserted by these authors to find new metric, the investment-cash flow measure is still widely accepted measure for measuring financial constraints in literature. As Guariglia (2008) suggests that different conclusions reached by these two strands may actually be due to different measurements of financial constraints used but their intuition is interlink.

2.6. Foreign investment

In recent years, as a result of global integration, there has been a remarkable increase in the number of corporations operating outside their country of origin. Their foreign business activities ranges from simple export to more complicated decisions including setting up wholly owned subsidiaries, licensing, franchising and joint venture. These multinationals face many different risks as the principle hazards that may affect most in the case of foreign investment. These risks relates to economic, legal, currency and political aspects of destination country (Kedia and Mozumdar, 2003).

Existing theories of multinational foreign investment and cross-border operations have developed independently from the literature on corporate domestic investment, but essentially coincide in terms of the firm's cost and availability of funding for investment (Horstmann and Markusen, 1989; Aguiar and Gopinath, 2005). In this perspective, the possible effects of availability of finance or cost of finance is somewhat similar on both domestic and investment finance. However, the likelihood of accessing additional channels of external finance and/or cheaper finance is higher for multinational firms to undertake foreign investments. For instance, Froot and Stein (1991) discuss the possibility of cheap finance channel through source-country overvaluation or target-country undervaluation for foreign investment. Somehow similarly, De Santis et al. (2004) and Klein et al. (2002) test the stock market valuations in domestic and foreign market as a determinant of corporate foreign investment.

Literature has reported the contradictory effect of foreign nature of investment on cost of capital. Robbins and Stobaugh (1973) suggest that firms with foreign investments are able to exploit market imperfection and reduce the cost of capital for international activities. For instance, firms can take advantage of distortions in host country interest rates, avoid host country credit restrictions, and obtain lower cost of debt because of differing risk premiums in various host country markets. Similarly, Shapiro (1978) and Hughes et al., (1975) report the negative relation between firm's foreign investment and cost of capital but their arguments rest on the benefits of diversification in reducing risks. The diversification of assets offers firms lower earnings volatility and reduces the probability of bankruptcy that in turn leads to a lower cost of capital for them.

On the other hand, opposite impact of foreign investment on cost of capital is posited by Solnik (1974). He rests his argument on the higher degree of risk associated with foreign investment. Similarly, Reeb et al. (1998) report that firms that engage in foreign investment

are more exposed to foreign exchange risk that in turn causes greater variance in the return of domestic currency. Both the political and foreign exchange risks leads to higher probability of financial distress, thereby, cost of capital increases. In addition to such risks, Armstrong and Riddick (2000) posit that foreign investments possess greater stakeholder heterogeneity and information asymmetry. The information discrepancies coupled with legal and regulatory differences increase the cost of financial distress; thereby cost of capital is higher for such firms. Another related argument for higher cost of capital for foreign investing firms is the agency costs. As Lee and Kwok (1988) note that foreign investments have greater agency costs than purely domestic projects since it is hard for investors to monitor foreign business activities. Empirical studies like Hughes et al. (1975) and Fatemi (1984) indicate that foreign investments have lower systematic risk than domestic investments that leads to lower cost of capital. Contrarily, Reeb et al., (1998) indicate that U.S. firms suffer higher cost of capital than their local peers. However, Brewer (1981) does not provide any evidence for the relationship between destination of investment and cost of capital. Taken together, available empirical studies present a mixed picture of the impact that foreign investment have on cost of capital.

In the absence of efficient and internationally integrated financial markets where any firm can source its funding anywhere regardless of country of residence, firms may adopt the opportunistic behaviour and undertake foreign investment in response to financial market imperfections. However, on the other hand, firms may also choose to behave in proactive way where firm can stay in its home market, or invest in foreign markets to internationalize its cost of capital and reap the benefits of the economies of scale (Forssback and Oxelheim, 2011). The recent waves of financial reforms around the globe, in fact, intend to alter the firm's reactive financial strategy to proactive financial strategy by improving the credit supply for foreign investment. The financial reforms in markets with financial discrepancies

facilitate firms to increase the extent of foreign investment by not only increasing the supply of external funds but also by encouraging firms to list in foreign markets. The positive affect of foreign listing on foreign investment is reported in the study of Modén and Oxelheim (1997) and Tolmunen and Torstila (2005). They find that European foreign listed firms are more likely to make foreign investment in US. Therefore according to main hypothesis of this study it is expected to find the positive effect of foreign listing, as an outcome of financial reforms, on the foreign investment.

2.7. Conclusion

The theory of firm investment has been reviewed in this chapter as it has developed since 1958 when Modigliani and Miller (1958) first argued that financial policy is irrelevant to the value of firm. Since then, this view has been amended and disputed by richer theoretical and empirical studies to relax underlying assumptions.

An important element that has been appended to the MM's (1958) proposition of irrelevancy is information asymmetry (Myers and Majluf instigated this discussion). Important dimension of this extension is the inclusion of cost of information asymmetry that exist between insider and outsider of firm, which creates a wedge between the cost of external and internal finance. Therefore, according to this theory firm should follow a financing hierarchy, exhibit a preference towards internal funds over funds generated externally, and whenever external funds are required, firms would seek for the cheaper source first.

This notion is initially tested by Fazzari et *al.*, (1988) and a number of subsequent empirical studies provide strong support for the existence of this financing hierarchy, which is most prevalent among firms that have been identified as facing a high level of financial constraints. These studies categorize firms according to characteristics; such as size, age, group membership, dividend payout ratio or debt ratings, that are designed to measure the level of

information asymmetry faced by firms in the capital market. Studies rely on the sensitivity of internal funds to the investment spending as a mechanism to measure the severity of financial constraints. The results suggest that investment decisions of firms that are more financially constrained are more sensitive to the availability of internal funds than those of less constrained firms.

To overcome capital market imperfections several economies have underwent financial market reforms in last two decades. There is evidence that for some developing countries financial reforms has led to a relaxation of constraints for those firms that had restricted access to finance in the pre-reform period. However, on the other side, it is argued that reforms distort the allocation of credit. In light of diverse findings regarding the impact of financial reforms, albeit it can be concluded that financial reforms are largely but not entirely, successful in helping firms to access external finance. Empirical evidences within individual countries and for cross-countries are still too weak to draw definitive conclusions regarding the impact of these financial reforms. In addition, these studies do not address directly and comprehensively the question of whether financial reform has any effect on firm's investment. To gain more insight into this important question of whether financial market reforms benefits developing countries, there is need to use panel data at the firm level to investigate the cross-sectional impact of reforms on firm investment in a large sample of developing markets.

Chapter 3: Empirical methodology and data description

This chapter starts with the formulation of empirical framework of this research. It follows with the data description of used variables in the analysis.

3.1. Jorgenson's (1963) model and Euler equation model

Several models of investment behaviour have been applied to flows of direct investment. One of the most influential models is Jorgenson's (1963) neoclassical model, where investment is described as a process of optimal capital stock adjustment. Jorgenson model identifies investment as adjustment to or toward the capital stock that will be optimal for a firm or industry (Caves, 1996). The level of capital stock depends on the required or optimal output level, and the price of output is based on cost of capital which comprised of interest and depreciation rates. The optimal capital stock is derived through maximization of discounted profit flows over an infinite time horizon. Jorgenson assumes that capital-labour ratios adapt to relative factor price changes, where the relative factor price of capital is measured as the user or rental cost of capital. At the end of the optimization problem in the model, the main determinants of investment emerge as the user cost of capital (essentially the relative cost of capital inputs) and output. In this neoclassical approach, policy prescriptions centre on allowing the market to operate freely and efficiently by promoting the flexibility of prices.

According to Chrinko (1993), given that the production function has a constant elasticity (σ) of substitution between capital and variable inputs, the relation between the desired stock of capital, the level of output, and the user cost (or rental price) of capital (C_t) can be achieved as follows:

$$K_t^* = \alpha Y_t C_t^{-\sigma} \quad (1)$$

and

$$C_t = p_t^I \frac{(r_t + \delta)(1 - m_t - z_t)}{1 - t_t} \quad (2)$$

where α is the distribution parameter, p_t^I is purchase price of new capital (relative to the price of output), r_t is the real financial cost of capital net of taxes, δ is the geometric rate of capital depreciation, m_t is the rate of the investment tax credit, z_t is the discounted value of tax depreciation allowances, and t_t is the rate of business income taxation. Equation (1) exhibits the dependence of the desired capital stock on a quantity variable (Y_t) and a set of price variables combines in user cost.

Net investment (I_t^n) is determined by a distributed lag on new orders, which equal in a given period the change in the desired capital stock. It can be represented as:

$$I_t^n = \sum_{j=0}^J \beta_j \Delta K_{t-j}^* \quad (3)$$

where β indicates the delivery lag distribution extending for $J+1$ periods. Replacement investment (I_t^r) is proportional to the capital stock available at the beginning of the period and in contrast to I_t^n , adjusts instantly. Mathematically, replacement investment can be expressed as:

$$I_t^r = \delta K_{t-1} \quad (4)$$

Combining equations (2), (3), and (4) and including a stochastic error (ε_t), we obtain the standard Jorgenson model of investment,

$$I_t = I_t^r + I_t^n = \delta K_{t-1} + \sum_{j=0}^J \alpha \beta_j \Delta(Y_{t-j} C_{t-j}^{-\sigma}) + \varepsilon_t \quad (5)$$

This typical Jorgenson's investment model assumes that capital stock adjustment is instantaneous, adjustment costs are zero, and investment decisions are completely reversible.

This means that investors do not have to look to the future in Jorgenson's world because they can respond quickly and effectively when the time comes; their expectations are essentially static. The sceptics have frequently questioned the consistency of this theoretical model by resting their arguments on following four issues. First, the profit maximization firm selects the level of capital stock and output level simultaneously. The model presented above in equation (5) does not recognise this fact. Second, the development of (5) was based on an inharmonious treatment of delivery lags. The optimal capital stock in equation (2) was derived under the assumption that delivery of capital goods was immediate, but the net investment equation (3) was based on a delivery lag distribution. Under such circumstances, the investment generated in equation (5) is not optimal. Third, K_t^* in equation is not well defined under the condition when production technology produces constant returns. Fourth, the prices, quantities, and autonomous shocks as determinants of investment spending are sensitive to estimation.

Following widespread criticism, ad hoc lags are introduced into later specifications of Jorgensonian models to capture expectations. However, the introduction of these specifications converts the Jorgensonian model from a neoclassical investment model to a modified accelerator model (Chrinko, 1993).

Though the neoclassical model has proved popular in studies investigating statistically foreign investment decision, however its foundation in pure competitive markets is limited. As Caves (1996) explains, the Jorgenson model does not apply to foreign investments which yield downward sloping demand curve. The subsequent empirical studies attempting to capture this future uncertainty more effectively are still not able to solve the problem of forecasting (Gezici, 2007). One attempt to solve the issue relating to unobservable expected variables is known as the Euler equation of investment and widely adopted in the financial

literature. Unlike the Jorgenson model, the Euler model incorporates the dynamic elements and expectation parameters that appear explicitly in the optimization problem.

According to Love (2003), the main intuition of the Euler equation is like this: the marginal cost of investing today (given by the sum of adjustment costs and the price of investment goods) is equal to the discounted marginal cost of postponing investment until tomorrow. The latter is equal to the sum of the foregone marginal benefit of an extra unit of capital, plus the adjustment cost and the price of investment tomorrow. The Euler model implies that along the optimal capital accumulation path, the firm will be indifferent to an increase in capital today only if there is a decrease by an equivalent amount in the next period, thus leaving the capital stock unaffected from the next period onward.

3.2. Structural models of firm investment based on the Euler equation

This section describes a dynamic model of value optimization of a firm under an imperfect capital market, which closely follows the models in Correa (2008); Love (2003) and Laeven (2003)¹. We begin by assuming that a firm maximizes its value by choosing investment and debt which is equal to the expected the expected discount value of dividends subject to the capital accumulation and external financial constraints.

Let V_t be the value of a firm's market value at time t , K_t the firm's capital stock at time t , B_t the firm's financial liabilities, ξ_t is productivity shock, I_t is investment expenditure, D_t is non-negative dividend payment shareholder at time t . So, firm's optimization problem is given as:

$$V_t(K_t, B_t, \xi_t) = \max_{\{I_{t+s}, B_{t+s+1}\}_{s=0}^{\infty}} D_t + E_t \left[\sum_{s=1}^{\infty} \beta_{t,t+s} D_{t+s} \right] \quad (6)$$

¹ Several authors derived investment model with market frictions in different ways, for instance, Forbes (2003); and Hayashi (1982).

where $E_t[\cdot]$ is the expectations operator conditional on information available at time t and β is the firm's discount factor.

The market value of a firm defined in equation (6) intrinsically depends on the amount of capital stock it possesses and the dividend it pays to shareholder in the previous year. The value of capital stock comprises of investment and the discounted capital stock of last year while the second factor, dividend paid to shareholders, depends on the net profit earned in the last year. Formally these constraints can be expressed in the following three equations:

$$D_t = \Pi(K_t, \xi_t) - C(I_t, K_t) - I_t + B_{t+1} - (1 - r_t) \left(1 + \eta(B_t, K_t, \xi_t) \right) B_t \quad (7)$$

$$K_{t+1} = (1 - \delta)K_t + I_t \quad (8)$$

$$D_t \geq 0 \quad (9)$$

where, r_t is the risk free rate of return, $\Pi(K_t, \xi_t)$ is the restricted profit function (already maximized with respect to variable costs), and $C(I_t, K_t)$ is the convex adjustment cost function for investment.

Equation (7) defines the dividend D_t paid to shareholders at period t as the difference between the profit generated in a given period t and the cost of investment. Financial frictions are introduced in the model by adding an external finance premium that is an increasing function of firm's debt at time t , given by $\eta(B_t, K_t, \xi_t)$ and which influences the cost of investment. Specifically, the gross required rate of return on debt is $(1+r_t) (1 + \eta(B_t, K_t, \xi_t)) B_t$, where r_t is the risk free rate of return.² Equation (8) represents the capital accumulation constraint which includes the rate of capital depreciation. Finally, we impose a non-negativity constraint on dividends in equation (9).

² The firm's infinite horizon optimization problem is usually reduced to a two-period problem. At the beginning of the period the firm selects how much capital it wants to install.

The two first-order conditions to the above maximization problem are:

$$1 + \frac{\partial C(I_t, K_t)}{\partial I_t} = \beta_t E_t \left[\frac{1 + \lambda_{t+1}}{1 + \lambda_t} \left\{ \left(\frac{\partial \mathcal{D}_{t+1}}{\partial K_{t+1}} \right) + (1 - \delta) \left(1 + \left(\frac{\partial \mathcal{X}_{t+1}}{\partial I_{t+1}} \right) \right) \right\} \right] \quad (10)$$

and

$$E_t \left[\left\{ \left(\frac{1 + \lambda_{t+1}}{1 + \lambda_t} \right) + \left(1 + \eta_{t+1} + \left(\frac{\partial \eta_{t+1}}{\partial B_{t+1}} B_{t+1} \right) \right) \right\} \right] = 1 \quad (11)$$

Equation (10) can be interpreted as the marginal cost of investing at time t being equal to the discounted marginal cost of investing one period later. The marginal cost of investment is represented by $\frac{\partial C(I_t, K_t)}{\partial I_t}$ and $\frac{\partial \mathcal{D}_{t+1}}{\partial K_{t+1}}$ is marginal product of capital (MPK). Φ_t represents the relative shadow cost of external finance in period t and $t+1$. The MPK is function of sales to capital ratio, following Gilchrist and Himmelberg (1999), it is assumed that a production function has a Cobb-Douglas form which can be represented as $MPK_{it} = \theta_i (S_{it}/K_{it})$, where θ is capital share in the production function, and S is the firm sale.

Since this first-order condition presented in equation (11) is not related to the Euler equation for investment, this paper follows Correa (2008) and Laeven (2003) and focus on the investment decision leaving the choice of debt implicit.

The key parameter in equation (10) is the shadow cost of external finance is represented as $\Phi_t = (1 + \lambda_{t+1})/(1 + \lambda_t)$ where, λ_t is the shadow cost of external funds, or a premium on outside finance. In perfect capital markets, where $\lambda_{t+1} = \lambda_t = 0$ and $\Phi_t = 1$ for all t , the firm is never constrained. In imperfect capital markets, the relative shadow cost of external finance over period t and $t+1$ is $(1 + \lambda_{t+1})/(1 + \lambda_t)$ where, λ_t is the shadow cost of external funds. On the other

hand, if the firm is financially constrained in period $t+1$, then we can infer that $\lambda_t=0$ and $\lambda_{t+1}>0$, and so $\Phi_t>1$.

In the case of financial reforms in emerging markets, we expect financial reforms to ease the credit constraint in the economy through increasing the flow of credit to firms. Thus, the shadow price of capital in period $t+1$ (after reform) is likely to be zero, whereas in pre-reforms period the firm bears a shadow cost due to the scarcity of capital. Therefore, *ceteris paribus*, the outcome of financial reforms are $\lambda_{t+1}<\lambda_t$ and $\lambda_{t+1}=0$, and $\Phi_t<1$. However, with capital market imperfections, Φ_t depends on a vector of state variables and observable firm characteristics and so the stochastic discount term may be quite different for each firm.

To arrive at the empirical model, equation (10) is parameterized and transformed as explained in the following subsection.

3.3. Specifying the empirical equation

The stochastic discount factor $1+\lambda_{t+1}/1+\lambda_t$ induced by financial constraints enters in the equation (10) in a multiplicative form. In empirical estimations, generally it is easier to estimate the financial constraints when they are additive. Therefore, the product of stochastic and deterministic discount factor $(\beta^s(1-\delta)^{s-1})$ in equation (10) is linearized using a first-order approximation around the means get the following improved form:

$$1 + \frac{\partial C(I_t, K_t)}{\partial I_t} = \Psi + E_t \left[\sum_{s=1}^{\infty} \beta^s (1-\delta)^{s-1} MPK_{t+s} \right] + \varphi E_t \left[\sum_{s=1}^{\infty} \beta^s (1-\delta)^{s-1} \Phi_{t,t+s} \right] \quad (12)$$

where Ψ includes all constant terms and assumed that $E(\Phi_{t,t+1}) \cong 1$ and $E(MPK) \cong \varphi$.

To express the above expression in a closed-form form it is necessary to specify the adjustment cost function. So, following the standard assumption in the literature (Love, 2003), linear homogeneity in investment and capital is assumed. Thus, the functional form is as:

$$C(I_{i,t}, K_{i,t}) = \frac{\alpha}{2} \left[\frac{I_{i,t}}{K_{i,t}} - g \frac{I_{i,t-1}}{K_{i,t-1}} - V_i \right]^2 K_{i,t} \quad (13)$$

where i is firm and v_i is a firm specific effects. This equation includes the lagged term of investment to capital ratio to measure the persistence observed in the data.

The important aspect of this estimation is the definition of the stochastic discount factor representing financial constraints $\Phi_{t,t+s}$. The earlier related work has relied on *ad hoc* parameterizations using observed firm specific variables representing firm's financial health to identify the effect of financing constraints on investment decisions. This study follows the similar pattern and uses the “stock of liquid assets”, namely the value of cash and equivalents, and divide it by the capital stock to parameterize $\Phi_{i;t,t+s}$ as:

$$\Phi_{i;t,t+s} = \phi_{0i} + \sum_{k=1}^s \phi \left[\frac{CF_{i,t+k}}{K_{i,t+k}} \right] \quad (14)$$

where CF is measured at the beginning of the period t and ϕ_{0i} is a firm specific effect.

A large literature (i.e. Khanna and Palepu, 1997; and Khanna and Yafeh, 2005) suggests that stochastic discount factor is different for business group affiliated firms. They argue that business group acts as an intermediary between individual affiliated firm and imperfect capital market that result in reduced financial frictions. Similarly, studies (i.e. Cull et al., 2009; and Poncet et al., 2010) provide evidence of the impact of state-ownership on the outside financing and show that cost of capital is substantially lower for state-owned firms than private firms. Therefore, to capture the impact of these firm-specific factors on financial constraints, business group affiliation BG and state-ownership SOE are interacted with the stochastic discount factor, and shown as:

$$\Phi_{i,t,t+s} = \Phi_{0i} + \sum_{k=1}^s (\Phi_1 + \Phi_2 BG_i + \Phi_3 SOE_i) \left[\frac{CF_{i,t+k}}{K_{i,t+k}} \right] \quad (15)$$

A fairly large body of scholarly work emphasises that financial reforms can improve firm investment through increasing the supply of funds and facilitating firms to raise funds by listing in foreign markets³. Since, the main hypothesis of this study is that financial reforms reduce financial constraints to firm investment. We therefore, also interact the variables for credit supply and access to credit in foreign markets with discount factor. The augmented form of equation is as follows:

$$\Phi_{i,t,t+s} = \Phi_{0i} + \sum_{k=1}^s (\Phi_1 + \Phi_2 BG_i + \Phi_3 SOE_i + \Phi_4 YSR_j + \Phi_5 FList_i) \left[\frac{CF_{i,t+k}}{K_{i,t+k}} \right] \quad (16)$$

where YSR is a measure for supply for funds indicating years since reforms in a country j and $FList$ indicates firm's foreign listing.

³ A comprehensive survey of theoretical literature on the finance-growth nexus is available in Levine (1997).

The interactive terms $(CF/K)_{it}$, $((CF/K)*BG)_{it}$, $((CF/K)*SOE)_{it}$, $((CF/K)_{it}*YSR_j)$, $((CF/K)*FList)_{it}$ and MPK_{it} are represented by a vector autoregressive process of order one. This makes it possible to express equations (12) and (16) as a linear function of the current value of these variables. After the required substitutions, linearization, and adding an error term, the empirical model is given by:

$$\begin{aligned} \frac{I_{i,t}}{K_{i,t}} = & a + \beta_1 \frac{I_{i,t-1}}{K_{i,t-1}} + \beta_2 \frac{CF_{i,t-1}}{K_{i,t-1}} + \beta_3 \frac{CF_{i,t-1}}{K_{i,t-1}} * BG_{i,t} + \beta_4 \frac{CF_{i,t-1}}{K_{i,t-1}} * SOE_{i,t} + \beta_5 \frac{CF_{i,t-1}}{K_{i,t-1}} * YSR_{t,j} + \\ & \beta_6 \frac{CF_{i,t-1}}{K_{i,t-1}} * FList_{i,t} + \beta_7 \frac{S_{i,t-1}}{K_{i,t-1}} + \beta_8 \frac{D_{i,t-1}}{K_{i,t-1}} + f_i + d_c + \varepsilon_{it} \end{aligned} \quad (17)$$

where f_i are firm fixed effects and d_c denote country dummies capturing aggregate shocks differentiated by countries. The error term ε_{it} is orthogonal to any information available at the time when the investment decision is made.

With respect to the coefficients in Equation (15), the main testable hypotheses of this study are formally stated as:

$$\beta_2 > 0, \beta_3 < 0, \beta_4 < 0 \quad (18)$$

and the impact of financial reforms as tested as:

$$\beta_2 > 0, \beta_5 < 0 \text{ and } \beta_6 < 0 \quad (19)$$

That is, firm-level financial constraint decreases with the financial reforms as credit supply and funds through foreign listing increases.

International finance literature distinguishes between foreign investments from domestic investments due to the different level of risk exposure associated with them (Desai et al., 2007). The evidence indicates that the volatilities of investment returns vary substantially for domestic and foreign investment owing to information asymmetries and risk differences. This increased volatility of returns is higher for foreign investments and is also manifest in a greater likelihood of annual losses for foreign investments. These factors make lenders biased against foreign investments having less visibility and high risk. Therefore, it is considered that financial constraints in the credit market to foreign investment are higher than domestic investment.

Following this argument, we divide our investment into domestic and foreign investments and expect that discount factor interacts differently with investment–cash flow sensitivity for domestic and foreign investment. Moreover, we expect to have magnitude of coefficients different for domestic and foreign investment. The estimation equations for domestic and foreign investments are follows:

$$\begin{aligned} \frac{I_{i,t}^d}{K_{i,t}} = & \alpha + \beta_1^d \frac{I_{i,t-1}}{K_{i,t-1}} + \beta_2^d \frac{CF_{i,t-1}}{K_{i,t-1}} + \beta_3^d \frac{CF_{i,t-1}}{K_{i,t-1}} * BG_{i,t} + \beta_4^d \frac{CF_{i,t-1}}{K_{i,t-1}} * SOE_{i,t} + \beta_5^d \frac{CF_{i,t-1}}{K_{i,t-1}} * YSR_{t,j} \\ & + \beta_6^d \frac{CF_{i,t-1}}{K_{i,t-1}} * FList_{i,t} + \beta_7^d \frac{S_{i,t-1}}{K_{i,t-1}} + \beta_8^d \frac{D_{i,t-1}}{K_{i,t-1}} + f_i + d_c \\ & + \varepsilon_{it} \end{aligned} \quad (20)$$

and

$$\begin{aligned} \frac{I_{i,t}^f}{K_{i,t}} = & \alpha + \beta_1^f \frac{I_{i,t-1}}{K_{i,t-1}} + \beta_2^f \frac{CF_{i,t-1}}{K_{i,t-1}} + \beta_3^f \frac{CF_{i,t-1}}{K_{i,t-1}} * BG_{i,t} + \beta_4^f \frac{CF_{i,t-1}}{K_{i,t-1}} * SOE_{i,t} + \beta_5^f \frac{CF_{i,t-1}}{K_{i,t-1}} * YSR_{t,j} \\ & + \beta_6^f \frac{CF_{i,t-1}}{K_{i,t-1}} * FList_{i,t} + \beta_7^f \frac{S_{i,t-1}}{K_{i,t-1}} + \beta_8^f \frac{D_{i,t-1}}{K_{i,t-1}} + f_i + d_c \\ & + \varepsilon_{it} \end{aligned} \quad (21)$$

3.4. Econometric issues in estimation

The ordinary least squares (OLS) estimation of equations (17) may yield unsatisfactory results, because dynamic investment models are likely to suffer from both endogeneity and heterogeneity problems (Bond, 2002). Since the error term captures a technology shock to the profit function, it may be correlated with explanatory variables such as sale and cash flow. The presence of lagged endogenous variables for investment will also bias the coefficient estimates for the OLS estimation.

Since the model, as specified in central estimating equation (17), contains lagged dependent variable, endogeneity of regressor can be a potential problem (Arellano & Bond, 1991). More specifically, as Laeven (2002) reports that in dynamic investment models the presence of unobserved firm-fixed effects cause endogeneity problem. To eliminate unobserved firm-fixed effects, and endogeneity of regressors, one can estimate the investment equation in first-difference. The generalised method of moments (GMM) estimation is widely used with lagged independent variables as instruments for this purpose to estimate the dynamic panel data models in first-difference.

A necessary condition to run GMM estimation is to assure the validity of underlying assumptions on which it is based, namely, validity of instruments and error term should be serially uncorrelated from residuals. In order to check the validity of instruments, Sargan test of overidentifying restrictions is used to check the overall validity of the instruments. Second, second order (AR-2) tests examine the hypothesis of serial uncorrelation of error term with regressor. The failure to reject the null hypotheses for AR-2 provides support to the model.

The rational expectation error, ε_{it} is orthogonal to any information available at the time when the investment decision is made, which is the beginning of the year. Taking into account that

firms report their information at the end of the year, all information available to managers will be dated $t-1$. As a result, the orthogonality conditions for this model are given by $E[\varepsilon_{it} | x_{t-s}] = 0$ for $s \geq 1$. I estimate the model by GMM with an optimal weighting matrix, using as instruments $t-1$ and $t-2$ lags of all the variables in the regression. The weighting matrix takes into account the panel structure of the data.

Under the assumption that the error term is not serially correlated and the explanatory variables are weakly exogenous (or predetermined as commonly referred in GMM literature), the two stage moment conditions apply to the lagged dependent variable and the set of explanatory variables. The GMM estimator uses these moment conditions to estimate the parameters consistently and efficiently in two steps.

Estimation work is carried out using *Stata 11* and *do* file is provided in Appendix.

3.5. Dataset used in estimations

The data used in this paper is taken from ORBIS, provided by the Bureau van Dijk (BvD). It's a largest set of firm level data that provides the detailed financial accounts information as well as other detailed firm specific information for more than 650,000 firms. Our sample contains data on total 501 non-financial large firms having foreign subsidiaries from India and China. ORBIS defines very large companies as those with operating revenue of at least US \$40 m or over 1000 employees. In particular, Indian 287 firms represent 57% of total sample and 214 Chinese firms represent 43% of total sample. We select large firms to test the aforementioned hypotheses because impact of financial reforms in terms of foreign listing is most likely to appear notably on large companies. Furthermore large firms are most suitable candidates to investigate the foreign investment pattern as a response of financial reforms. We use an unbalanced panel dataset since unbalanced panel structure has the benefit of partially mitigating potential selection and survival bias problems (Carpenter and Guariglia,

2008). The focus is given to non-financial firms, having SIC less than 6000, from period 2000 to 2009. The intuition to restrict our dataset only to non-financial firms is that the accounting treatment of revenue and profits for financial firms (banks, insurance and investment firms) is significantly different than that in non-financial firms. Therefore, it is not appropriate to compare the investment policies of such firms with non-financial firms. We focus on listed firms mainly for two reasons. First, since our estimation model investigates the effect of reform through credit supply and foreign listing therefore, only publically listed firms are appropriate for this study. Second, the quality of the accounting data is higher for listed firms.

Our sample selection criterion approves only such firms which have observations for at least 5 years which permit us to observe the variation in firm's financing behaviour. Firm level data is eliminated if a firm has missing values for explanatory variables. In addition, we try to mitigate the effect of outliers and errors in the data by excluding all observations for which variables have extreme deviating values from their means. Following Ratti et al. (2008) we exclude the observations with I/K above 2.5, CF/K above 0.7, S/K above 20 and D/K above 10. The number of observations dropped because of this criterion is 41. We also eliminate the firm-years if their values for capital stock and sale are found negative. There were only 5 firm-years observations containing negative value of either capital stock or net sale. In total, 46 observations have been removed from the sample. After applying these restrictions and screening for apparent coding errors and missing variables, an unbalanced panel of 4813 firm-year observations left for estimation.

3.6. Variables constructed

3.6.1. Dependent variable

The total investment is measured as the change in capital stock by the end of the accounting year, net of depreciation. i.e. $I_t = K_t - K_{t-1} + Depreciation$. Depreciation in each year is calculated as the difference between the accumulated depreciation of the current year and that of the previous year. Whereas, capital stock is calculated as the item “Tangible Fixed Assets” on the balance sheets, which includes accumulated depreciation. Specifically, it is the sum of machinery, plants, equipment, buildings, land, property, other tangible assets, and construction-in-progress. Inventories are reported separately and not included in the calculations.

ORBIS does not report separate balance sheet figures for firm foreign investment; therefore we revert to financial statements of firm foreign subsidiaries and treat change in their capital stock from previous year plus depreciation as a firm foreign investment. Regarding firm’s domestic investment, the difference between total investment and foreign investment is considered as domestic investment of a firm.

3.6.2. Independent variable

The variable of interest, CF , is operating cash flow at time t , which is calculated as operating income at time t plus depreciation at time t . A firm is considered as financially constrained if it does not has access to external finance to undertake investment opportunities and has to rely mostly on internal capital. Therefore, we use investment-cash flow sensitivity as a measure of financial constraints. A significant and positive coefficient on cash flow would be the indicator of financial constraints.

For our variable *YSR*, we consider two elements of financial reform; banking sector and interest rate reforms; and securities markets and financial institutions reforms. We mark the year of introducing these reforms and years since then are taken as the value of *YSR*. In doing so, we establish the reform launching years 1991 and 1993 for India, and China, respectively. In doing so, a time variant digit is used which represents the difference between the time period *t* and reforms cut-off year. In estimation, this variable (*YSR*) interacts with cash flow variable. Theoretically, the negative sign on this interactive term would be the indicator of elimination or reduction of financial constraints to firm investment. Similarly, a variable for foreign listing, (*FList*), measured as takes value 1 if a firm is internationally listed in a given year, is also interacted with cash flow variable to capture the impact of financial reforms in terms of foreign listing. A negative and statistically significant sign on interactive term would indicate that foreign listing has successfully reduced the financial constraints to firm investment.

Firm debt is measured as total debt of a firm, including long-term and short-term, and sale is measured as firm's total sale for a specific period. The information on firm business group affiliation and state-ownership is also taken from financial statements of respective firms. A firm is defined as group affiliated firm if it belongs to any business group, and we define a firm as being state-owned if there is presence of government ownership in any fraction. Effects of business groups is captured by a dummies, *BG* taking the value 1 if a firm is affiliated to business group in a given year, otherwise 0. State-ownership *SOE* is measure a dummy variable taking value 1 if there is presence of government ownership in any fraction, 0 otherwise. Table 3.1 presents the sources and definition of variables used in the estimation.

Table 3.1: Variable construction

<i>Variables</i>	<i>Acronym</i>	<i>Definition</i>	<i>Source</i>
<i>Investment</i>	I	Change in net capital stock from period $t-1$ to t , plus accumulated depreciation	ORBIS
<i>Foreign investment</i>	I^f	Change in net capital stock from period $t-1$ to t , plus accumulated depreciation of foreign subsidiaries	ORBIS
<i>Domestic investment</i>	I^d	Difference between total investment and foreign investment	
<i>Capital stock</i>	K	Tangible assets of period t	ORBIS
<i>Cash flow</i>	CF	Firm operating net income at the end of period t plus the accumulated depreciation	ORBIS
<i>Years since reforms</i>	YSR	Number of years since reforms. The year of major financial reforms is 1991 and 1993 for India and China, respectively.	
<i>Net sale</i>	S	Total sale at the end of period t	ORBIS
<i>Total Debt</i>	D	Book value of total debt at the end of period t	ORBIS
<i>Foreign listing</i>	$FList$	A dummy variable taking value 1 if a firm is internationally listed, 0 otherwise.	ORBIS
<i>Business group</i>	BG	A dummy variable taking value 1 if a firm is affiliated to business group, 0 otherwise	ORBIS
<i>State-ownership</i>	SOE	A dummy variable taking value 1 if there is presence of government ownership in any fraction, 0 otherwise	ORBIS

Chapter 4: Findings and Discussion

The research hypotheses discussed earlier in Chapter 3 are tested in this chapter. In particular, this chapter starts with the data descriptive of the used variables in the analysis. It follows with the analysis and discussion of estimated results.

4.1. Descriptive statistics

We tabulate the descriptive statistics per country in Table 4.1, and the first thing to notice is that the distribution of firm total investment to capital stock ratio varies widely across countries. This measure can be thought of as the intensity of investment for the firm. Based on this measure, Chinese firms are investing heavily, almost 86% to their capital stock, compared to 53% for Indian firms. The similar pattern is observed for foreign and domestic investment. Chinese firms are leading the foreign and domestic investment. Next, the fraction of sales to capital stock can be seen as fixed assets turnover ratio, which measures the operational efficiency of the firm. There is no significant difference is found in sale volume among Indian and Chinese firms. The operational efficiency for Indian and Chinese firms is found 3.095 and 3.009, respectively.

The cash-flow ratio is particularly high for Indian firms, about 23%, while Chinese firms maintain this ratio at 18.6%. We may attribute the Indian higher cash flow ratio to the fact that sampled firms hold large cash stock as a buffer to protect themselves against adverse cash flow shocks. In addition, as Opler et *al.*, (1999) pointed out firms with low access to the capital market tend to hold higher cash because of transactional and/or precautionary motives. Transactional motive for holding cash implies that firm holds cash to save on the transaction costs of raising funds from external sources and to avoid having to liquidate assets to make payments. On the other hand, precautionary motive asserts that firm holds cash reserves to deal arduous circumstances and to continue investing in positive NPV projects

during the periods when external financing is costly because of information asymmetric problem.

For debt utilization, there is not a significant difference among Indian and Chinese firms. Indian firms have leverage ratio of 1.912, while for Chinese firms this ratio about 1.905. Regarding business group affiliation, firms operating in both emerging countries, Indian and China, have higher trend to affiliate themselves to a certain business group. In particular, in Indian market, 61% firms are found to be affiliated to a business group, while 44% firms are associated to a business group in China.

State ownership is quite common among Chinese sampled firms. More than 81% firms have state ownership in any fraction whereas this aspect is not quite common among Indian firms. Last, raising finance through foreign listing is quite common in Indian firms, showing (81%) of firms are listed abroad, however, foreign listing is exceptionally lower for Chinese firms (41%) reflecting their dependence on leverage.

Table 4.1: Mean values of variables across countries

	<i>India</i>	<i>China</i>
I/K	0.530	0.859
I^f/K	0.102	0.145
I^d/K	0.427	0.713
CF/K	0.230	0.186
S/K	3.095	3.009
D/K	1.912	1.905
BG	0.610	0.440
SOE	0.026	0.811
$FList$	0.814	0.467

4.2. Estimated results for total investment

The main results for firm total investment are based on the model given in equations (10-12) and are reported in Table 4.2. Columns (1) to (3) presents the Indian sampled firms and Chinese sampled firms are presented in columns (4) to (6). We include all large firms operating in developed countries from 2000-2009, with the exception of financial firms.

In columns (1), (2) and (3), we first estimate the degree of financial constraints to firm's total investment of Indian firms, then impact of business groups and state-ownership on financial constraints is captured, and last, impact of financial reforms is incorporated through introducing variables credit supply and foreign listing. Results in specification (1) show that firm total investment depends on investment of previous year. The coefficients are positive and statistically significant at 1% level. The coefficient for cash flow (β_2) is negative but statistically insignificant. However, second and third specification shows the positive and statistically significant coefficient on cash flow, indicating that firms are financially constrained in the market. Next, we capture the impact of business group affiliation and state-ownership on the extent of financial constraints. Results indicate that the interaction of business group and cash flow (β_3) achieved negative and statistically significant sign for both specifications. This is supportive of the idea that the access to financial constraints of group affiliated firms is different to that of independent firms. Specifically, consistent with market failure and resource sharing views of business groups, these results indicate that the investment of group affiliated firms is less sensitive to the availability of internal capital.

Next, the state-ownership (β_4) entered in both models with negative sign but could not achieve the statistical significance, implying that state ownership does not effect on the financial constraints to firm overall investment in Indian market. With respect to hypotheses of this study $\beta_2 > 0$, $\beta_3 < 0$, $\beta_4 < 0$, results in specification (2) and (3) supports the first

hypothesis ($\beta_2 > 0$) that firms are financially constrained, while these constraints are decreased because of group affiliation ($\beta_3 < 0$) is strongly supported by all specifications. Lastly, results testing the impact of state-ownership show that state-ownership is not relevant to firm investment for Indian firms. In sum, the results are in line with the work of Ghosh (2006) and Bhaduri (2006) that report financial constraints in Indian market.

The results for the first variable measuring impact of financial reforms on the severity of financial constraints (supply of funds proxied by *YSR*) show that indeed financial reforms has increased the amount of credit for firm investment and financial constraints have reduced. The coefficients are negative and statistically significant at 1% level in specifications (2) and (3). The second variable capturing effects of financial reforms, foreign listing, is also found to have negative but statistically insignificant. Our result strengthens the hypothesis regarding positive impact of financial reforms in terms of credit supply ($\beta_5 < 0$). However, we could not support our hypothesis for positive impact of foreign listing on financial constraints. Regarding other control variables used in analysis, debt is found to have positive but insignificant relationship with investment, whereas, sale maintains positive and statistically significant relationship with firm's total investment.

Next, we repeat the analysis and test the hypotheses for the Chinese sample. Results show that lagged investment positively and significantly associates with the current investment level in all specifications representing the firm's dependence on previous investment level. Next, the coefficient on cash flow variable is found to have positive and statistically significant sign in all specifications. It indicates that firms are financially constrained in the Chinese market. This result supports our hypothesis ($\beta_2 > 0$) stating the existence of financial constraints in the Chinese market. In contrast to Indian firms, business group affiliation is not found to be valuable in reduction of financial constraints in Chinese market. Consistent with hypothesis ($\beta_4 < 0$) state-ownership reduces financial constraints to total investment and

result in last specification is statistically significant at 10% level. This result shows that having a higher ratio of state-ownership reduces the extent to which the firm is financially constrained. This result is line with previous studies (Firth et *al.*, 2008; Poncet et *al.*, 2010) that conclude firms with a large presence of state-ownership experience less or no financial constraints. In sum, as conjectured, we find that private firms in China significantly rely on their cash flow to finance their investments, which is evidence of credit constraints, while state-ownership reduce these financial constraints.

The results for the impact of financial reforms are alike to earlier finding for Indian firms. The coefficient for interaction between cash flow and credit supply (β_5) is negative and statistically significant. It indicates that financial reforms reduce financial constraints through providing more credit for investment. The next variable measuring the impact of financial reforms through foreign listing (β_6) is found to have negative but statistically insignificant coefficient, indicating that firms foreign listing does not have any impact on financial constraints to investment. These results support our hypothesis ($\beta_5 < 0$) for the effective role of financial reforms in reduction of financial constraints. These results strengthen the findings of and Ponet et *al.*, (2010); and Huang (2003) that report presence of credit constraints in Chinese market and financial reforms in terms of increased credit supply has significantly reduced the firm's dependence on internal capital for investment.

The Sargan/Hansen test of over-identifying restrictions does not reject the validity of the instruments in all specifications. The test of second order serial correlation of the error term in all specifications indicates that the error term does not exhibit second order correlation. Overall, results for investment-cash flow sensitivity support our hypothesis for both Indian and Chinese sample, impact of business group affiliation and state-ownership support our hypotheses for Indian and Chinese sample, respectively. Hypothesis regarding impact of

financial reforms in terms of credit supply is strongly supported in both Indian and Chinese samples.

Table 4.2: GMM-IV estimation results for total investment

	Indian firms			Chinese firms		
	(1)	(2)	(3)	(1)	(2)	(3)
I_{it-1}/K_{t-1}	0.363*** (0.130)	0.179 (0.168)	0.014 (0.197)	0.429*** (0.112)	0.429*** (0.117)	0.576*** (0.121)
CF_{it-1}/K_{t-1}	-0.189 (0.524)	2.802** (1.342)	2.844** (1.174)	1.140*** (0.336)	0.131* (0.563)	0.177* (0.650)
$CF_{it-1}/K_{t-1} * BG_{ij}$		-5.058*** (1.803)	-4.216*** (1.607)		-0.286 (0.649)	-0.114 (0.696)
$CF_{it-1}/K_{t-1} * SOE_{ij}$		-0.650 (2.664)	-2.250 (2.640)		-1.613** (0.779)	-0.907** (0.822)
$CF_{it-1}/K_{t-1} * YSR_{ij}$			-0.041** (0.046)			-0.035** (0.016)
$CF_{it-1}/K_{t-1} * FList_{ij}$			-2.621 (2.527)			-0.798 (0.543)
D_{it-1}/K_{t-1}	0.063 (0.087)	-0.088 (0.112)	-0.083 (0.098)	-0.057 (0.131)	-0.169 (0.118)	0.075 (0.117)
S_{it-1}/K_{t-1}	0.111* (0.059)	0.255*** (0.081)	0.222 (0.072)	0.065 (0.051)	0.087 (0.054)	0.104 (0.058)
Number of Obs	1463	1463	1463	1226	1226	1226
Number of firms	287	287	287	214	214	214
Hansen p -value X^2	0.000	0.579	0.173	0.000	0.344	0.399
AR(2) p -value	0.830	0.380	0.840	0.211	0.043	0.668

Specification (1), (2) and (3) estimate the model (10), (11), and (12), respectively. The dependent variable is total investment. Second lag of all regressor are also employed as instruments. Standard errors are presented in parentheses. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

5.2. Estimated results for domestic and foreign investment

The estimated results for domestic investment are presented in table 5.2. The model specifications in equation (10-12) are re-estimated with only domestic investment for Indian and Chinese firms. The direction of relationship and statistical significance follows the earlier

pattern of total investment. The cash flow variable enters the model with positive statistically significant sign in specifications. It indicates that both Indian and Chinese firms are financially constrained for domestic investment. Results for the impact of business group affiliation and state-ownership are similar to earlier findings for total investment in both samples. Business group affiliation and state-ownership reduces financial constraints to domestic investment of Indian and Chinese firms, respectively.

Table 4.3: GMM-IV estimation results for domestic investment

	Indian firms			Chinese firms		
	(1)	(2)	(3)	(1)	(2)	(3)
I_{it-1}/K_{t-1}	0.380*** (0.142)	0.158 (0.176)	-0.036 (0.202)	0.388*** (0.120)	0.390*** (0.124)	0.558*** (0.133)
CF_{it-1}/K_{t-1}	-0.677 (0.481)	2.139* (1.195)	2.280** (1.042)	1.043*** (0.312)	0.285* (0.535)	0.326* (0.636)
$CF_{it-1}/K_{t-1} * BG_{ij}$		-4.563*** (1.168)	-3.950*** (1.40)		-0.209 (0.634)	-0.068 (0.694)
$CF_{it-1}/K_{t-1} * SOE_{ij}$		-0.138 (2.326)	-1.298 (2.335)		-1.667** (0.723)	-1.096** (0.788)
$CF_{it-1}/K_{t-1} * YSR_{ij}$			-0.042** (0.039)			-0.033** (0.016)
$CF_{it-1}/K_{t-1} * FList_{ij}$			-1.605 (2.219)			-0.258 (0.043)
D_{it-1}/K_{t-1}	-0.016 (0.078)	-0.096 (0.097)	-0.078 (0.085)	-0.136 (0.128)	-0.124 (0.113)	0.064 (0.116)
S_{it-1}/K_{t-1}	0.107** (0.052)	0.229*** (0.067)	0.206*** (0.061)	0.055 (0.051)	0.074 (0.053)	0.100* (0.058)
Number of Obs	1463	1463	1463	1226	1226	1226
Number of firms	287	287	287	214	214	214
Hansen p -value X^2	0.000	0.596	0.179	0.000	0.534	0.176
AR(2) p -value	0.759	0.483	0.943	0.994	0.294	0.678

Specification (1), (2) and (3) estimate the model (10), (11), and (12), respectively. The dependent variable is domestic investment. Second lag of all regressor are also employed as instruments. Standard errors are presented in parentheses. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

The estimated result for the impact of financial reforms on domestic investment is similar to earlier finding. Results for both samples reveal that financial reforms decrease financial constraints to domestic investment by increasing the supply of credit in the markets. These results for domestic investment also support our hypothesis for increased supply of credit ($\beta_5 < 0$) in the domestic market to facilitate domestic investment. Nevertheless, our results again, do not support the positive role of foreign listing in mitigating financial constraints.

Regarding control variables, sale is found to have positive and significant relationship with domestic investment for Indian firms. The p-values of Hansen test in all specifications indicate that it is impossible to reject the null hypothesis that the over-identifying restrictions are valid.

Table 5.3 shows the results for foreign investment. The finding on lagged foreign investment is similar to earlier estimations for total and domestic investment; however, we lost the statistical significance for Indian firms. The cash flow coefficient in all specification is positive and statistically significant for Indian firms and Chinese firms. It indicates that firms in India and China are financially constrained for foreign investment. Next, unlike previous findings, business group affiliation does not facilitate Indian firms to secure credit from international market for foreign investment. However, state-ownership among Chinese firm still has positive impact and reduces financial constraints for foreign investment. This result implies that benefits of group affiliation for Indian firms are only limited to domestic investment.

Table 4.4: GMM-IV estimation results for foreign investment

	Indian firms			Chinese firms		
	(1)	(2)	(3)	(1)	(2)	(3)
I_{it-1}/K_{t-1}	0.087 (0.139)	0.029 (0.128)	-0.095 (0.141)	0.394*** (0.118)	0.438*** (0.113)	0.403*** (0.109)
CF_{it-1}/K_{t-1}	0.446*** (0.109)	0.612*** (0.217)	0.496** (0.221)	0.051** (0.108)	0.168* (0.167)	0.258* (0.183)
$CF_{it-1}/K_{t-1} * BG_{ij}$		-0.338 (0.313)	-0.198 (0.294)		0.085 (0.193)	0.145 (0.193)
$CF_{it-1}/K_{t-1} * SOE_{ij}$		-0.456 (0.514)	-0.731 (0.527)		-0.182* (0.229)	-0.360* (0.230)
$CF_{it-1}/K_{t-1} * YSR_{ij}$			-0.069** (0.039)			-0.024* (0.004)
$CF_{it-1}/K_{t-1} * FList_{ij}$			-0.473 (0.516)			-0.229 (0.058)
D_{it-1}/K_{t-1}	0.002 (0.024)	-0.003 (0.023)	-0.014 (0.020)	-0.050 (0.041)	-0.042 (0.034)	0.001 (0.031)
S_{it-1}/K_{t-1}	0.001 (0.014)	0.010 (0.014)	0.007 (0.013)	0.016 (0.011)	0.013 (0.015)	0.012 (0.015)
Number of Obs	1463	1463	1463	1226	1226	1226
Number of firms	287	287	287	214	214	214
Hansen p -value X^2	0.061	0.184	0.570	0.077	0.158	0.141
AR(2) p -value	0.534	0.456	0.195	0.159	0.312	0.165

Specification (1), (2) and (3) estimate the model (10), (11), and (12), respectively. The dependent variable is foreign investment. Second lag of all regressor are also employed as instruments. Standard errors are presented in parentheses. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

The estimated effect of financial reforms in terms of credit supply remained same for foreign investment. The coefficient on interaction term (β_5) across both samples is negative and statistically significant, implying that both Indian and Chinese firms are benefited from increased credit supply for foreign investment. The achieved result supports our hypothesis for positive impact of financial reform on foreign investment ($\beta_5 < 0$). Next, we test that whether financial reforms have mitigated the financial constraints to foreign investment by facilitating firms to list abroad. Results show that such impact is not observable in both samples, though coefficient is negative but statistical significance is not achieved. Results for

both samples only support our hypothesis for increased credit supply ($\beta_5 < 0$) for foreign listing. The Sargan/Hansen test does not provide evidence against the specification and the choice of instruments.

In sum, results establish that financial reforms decrease financing constraints, measured by supply of credit to firm's overall investment as well as domestic and foreign investment.

Chapter 5: Conclusion

This chapter provides a summary of the key findings from our thesis and limitation of this study.

6.1. Concluding remarks

Though the problem of financial constraints is relevant to all markets around the globe but is more pertinent to developing economies. To overcome market financial frictions, since the beginning of 90's, several developing countries, including India and China have initiated financial reforms process. These financial market reforms mainly include the step like improving the bank's screening capabilities to mitigate information asymmetry issues in the capital market, removal of credit ceiling and administrative controls on interest rate, development of security and financial markets to reduce the cost of external financing, and removing the barriers to entry in the banking sector to promote finance penetration in the market, were introduced in this regard. Besides such optimistic intentions with reforms, the experience of last two decades of financial crises increased doubts about the potential benefits from financial reforms. As markets are getting more exposed to the whims of international capital market inflows, new opportunities of disruptive speculative financial activity emerged, leading to macro-economic instability with implications for private firm investment.

In the last two decades, foreign investment and exports have been identified as Chinese and Indian economy's main drivers to success. Therefore, using two large panels of Chinese and Indian non-financial firms, we examine the impacts of such financial reforms on firms' foreign investment. In particular, the main objective of this thesis is to empirically investigate the effects of financial reforms on financial constraints to overall investment decision as well as the domestic and foreign investment of firms of two leading emerging economies

In empirical analysis, using a panel data of 501 large Indian and Chinese firms having foreign subsidiaries for the period from 2000 to 2009, we investigate a dynamic model derived from Euler equation to study the impact of financial reforms on financial constraints. Using these two independent samples for each country, the baseline model is estimated separately for overall, foreign and domestic investment.

Estimation results suggest that cash flow is an important determinant of firm overall investment. Firms from both countries are found as financially constrained in their investment decision. The magnitude of coefficients indicates that intensity of financial constraints is higher in Indian market. Motivated by the unique institutional settings of these economies, two firm characteristics, business group and state-ownership, are introduced in the estimation model to capture the effect on group affiliation and state-ownership on the intensity of financial constraints to investment. Results indicate that business group affiliation in India and state-ownership in China help firms to circumvent the market constraints to their investment decision. The results are consistent with the hypothesis that firm use group affiliation and state-ownership as antidote to the existing imperfections in the market.

Next, the impact of financial reforms on overall investment is analysed through two channels: credit supply and foreign listing. The estimated results show that efficiency of fund allocation impacts positively on investment decision in both economies, supporting the positive outcomes of government programs of credit supply. The magnitude of this effect is larger for Indian firms, representing that financial policies targeting the credit excessive supply are more successful in India. However, econometric results are not supportive of a foreign listing both in Indian and China. Financial reforms assisting firms to foreign list do not seem to have had much effect on the financial constraints to investment decision.

In order to answer the question of how financial reforms affected domestic and foreign investment decision, the model is re-estimated for domestic and foreign investment independently. The estimation of Euler equations suggests that financial reforms have different effects for these investments. In particular, similar results emerge for domestic investment. Results indicate that firms both in India and China are financially constrained to their domestic investment. Business group affiliation and state-ownership help Indian and Chinese firms, respectively, in overcoming capital market imperfections. Financial reforms have led to an improvement in the efficiency with which funds have been allocated for domestic investment in both markets. However, as earlier, foreign listing don't seem to help in overcoming constraints to domestic investment.

With regard to foreign investment, our results for Chinese sample remained unchanged. Specifically, firms from both economies are found financially constrained for foreign investment. Again the magnitude is higher for Indian firms. Unexpectedly, business group affiliation does not have any effect for foreign investment of Indian firms. State-ownership continues to facilitate for foreign investment of Chinese firms. Impact of financial reforms remained persistent. Reforms have increased the credit supply for foreign investment in both countries, however, no empirical support is found for the positive effect of foreign listing on foreign investment.

This study presents useful insight into the financing problems to firm investment. Financial reforms in terms of foreign listing in Indian and China do not seem to have had effect on the financial constraints faced by firms when making investment decisions. The main limitation of this study, that also highlights the future research avenue, exists for estimation of foreign investment. The financial variable used for capturing the impact of leverage on foreign investment could have more efficient by measuring as the fraction of foreign debt to capital stock rather than total debt to capital stock. Similarly, foreign sale as the proxy for firm

growth could control the growth effect on foreign investment more accurately than entire sale of a firm. However, time restraints do not allowed incorporating these aspects in empirical estimations. Regarding estimation, the unavailability of foreign sale and debt data restrained us to apply seemingly unrelated regression (SUR) procedure for the present analysis. A SUR estimation method is more appropriate in this case since the firm's both investment decisions, domestic and foreign, are occurring simultaneously and the factors that determine these investment decisions are related to each other. Such estimation conditions creating possible contemporaneous correlation among firms and correlate the error terms across the equations. Therefore, to allow for the possibility that the error terms in domestic and foreign investment equations may contain the same unspecified factors, both equations should be estimated jointly using the SUR model.

Besides the limitations, this work also suggests some possible future research directions to extend our research. First, it would be interesting to examine the impact of financial reforms across firm age and coverage ratio. Mature and firms having higher coverage ratio hold sufficient internal funds, they don't have great need to borrow and will not face financial constraints at similar extent. Second, this work could be extended to study the impact of reforms on small and medium sized firms. For doing so, similar empirical setting can be employed to study the investment pattern of these firms.

References

- Aghion, P., Angeletos, M., Banerjee, A. and Manova, K. (2004), Volatility and growth: The role of financial development, Harvard University (Department of Economics), mimeo.
- Allayannis, G. and Mozumdar, A. (2004), The impact of negative cash flow and influential observations on investment-cash flow sensitivity estimates, *Journal of Banking and Finance* 28: 901-930.
- Almeida, H., M. Campello, and M. Weisbach. (2004). The Cash Flow Sensitivity of Cash. *Journal of Finance* 59: 1777 – 804.
- Armstrong, V., and Riddick, L. (2000), Evidence that differences in bankruptcy law among countries Affect Equity Returns, Working Paper, Washington State University.
- Arellano, M. and Bond, S. (1988), Dynamic Panel Data Estimation Using DPD – a Guide For Users”, Institute for Fiscal Studies Working Paper 88/15, London.
- Audretsch, D. and Elston, J. (2002), Does firm size matter? Evidence on the impact of liquidity constraints on firm investment behaviour in Germany, *International Journal of Industrial Organization* 20: 1–17.
- Aguiar, M., Gopinath, G., (2005), Fire-sale foreign direct investment and liquidity crises. *The Review of Economics and Statistics* 87: 439-452.
- Bai C-E, Lu J, Tao Z. (2006). The multitask theory of state enterprise reform: Empirical evidence from china. *American Economic Review* 96: 353-357
- Baxter, N., (1967). Leverage, risk of ruin and the cost of capital, *Journal of Finance* 22: 3956-403.
- Becchetti, L. and G. Trovato (2002), The determinations of growth for small and medium sized firms. The role of the availability of external finance, *Small Business Economics*, 19: 291–306.
- Bekaert, G. and Harvey, C. R. (2000), Foreign speculators and emerging equity markets, *Journal of Finance* 55: 565–613.
- Bhaduri, S. N. (2005). Investment, financial constraints and financial liberalization: Some stylized facts from a developing economy, India. *Journal of Asian Economics* 16: 704–718.
- Bond, S. (2002), Dynamic panel data models: A guide to micro data methods and practice, Institute for Fiscal Studies, London, Cemmap Working Paper CWP09/02.
- Bond, S, and Meghir, C. (1994), Dynamic investment models and the firm’s financial policy, *Review of Economic Studies* 61: 197–222.

- Borensztein, E. and Lee J. W. (1999), Credit allocation and financial crisis in Korea. IMF Working Paper WP/99/20.
- Brewer T. L. (1981), Political risk assessment for foreign direct investment decisions: better methods for better results, *Columbia Journal of World Business* (Spring): 5-11.
- Carpenter, R. and Petersen, B. (2002), Is the growth of small firms constrained by internal finance?, *Review of Economic Statistics*, 84: 298-309.
- Carpenter, R.E., Guariglia, A. (2008), Cash flow, investment and investment opportunities: new tests using UK panel data, *Journal of Banking and Finance* 32: 1894-1906.
- Caves, R. E. (1996), *Multinational enterprise and economic analysis*, New York: Cambridge University Press.
- Chirinko, R. (1993), Business fixed investment spending: Modelling strategies, Empirical results, and policy implications, *Journal of Economic Literature*, 31: 1875-1911.
- Cleary, S. (1999), The relationship between firm investment and financial status, *Journal of Finance* 54: 673-692.
- Correa, R. (2008), Bank Integration and Financial Constraints: Evidence from U.S. Firms, Federal Reserve System (U.S.) in its series *International Finance Discussion Papers* 925.
- Cull, R., Xu, L.C. and Zhu, T. (2009), Formal finance and trade credit during China's transition. *Journal of Financial Intermediation* 18: 173-192.
- De Santis, R.A., Anderton, R., and Hijzen, A (2004), On the determinants of Euro area FDI to the United States: The knowledge-capital—Tobin's Q framework (Working Paper 329). European Central Bank.
- Desai, M. A., Dyck, L. and Zingales, L. (2007), Theft and Taxes, *Journal of financial economics*, 84: 591-623.
- Dittmar, A., Mahrt-Smith, J. and Servaes, H. (2003), International corporate governance and corporate cash holdings. *Journal of Financial and Quantitative Analysis* 38: 111-133.
- Dollar, D. and Wei, S. (2007), (Das wasted) kapital: Firm ownership and investment efficiency in China, NBER working paper 1303.
- Donaldson, G. (1961), *Corporate debt capacity: A study of corporate debt policy and the determination of corporate debt capacity*, Boston division of research, Harvard Graduate School of Business Administration.
- Fagiolo, G. and Luzzi, A. (2006), Do liquidity constraints matter in explaining firm size and growth? Some evidence from the Italian manufacturing industry, *Industrial and Corporate Change*, 15: 1-39.

- Fatemi, A., (1984), Shareholder benefits from international diversification, *Journal of Finance* 39: 1325-1344.
- Fazzari, S., Hubbard, G. M. and Petersen B. C. (1988), Financing constraints and corporate investment, *Brookings Papers on Economic Activity*, 141-195.
- Firth, M., Lin, C. and Wong, S. M. (2008), Leverage and investment under a State-owned bank lending environment: Evidence from China, *Journal of Corporate Finance*, 14: 642-53.
- Fisman, R. and Love, I. (2003), Trade credit, financial intermediary development, and industry growth. *Journal of Finance* 58: 353–74.
- Forbes, K. J. (2003), One cost of the Chilean capital controls: increased financial constraints for smaller trade firms, *NBER Working Paper Series*, No. 9777.
- Forssback, J. and Oxelheim, L. (2011), Corporate financial determinants of foreign direct investment, *The Quarterly Review of Economics and Finance* 51: 269-282.
- Froot, K., and Stein, J. (1991), Exchange rates and foreign direct investment: An imperfect capital markets approach, *Quarterly Journal of Economics*, 106: 1191-1217.
- Galindo, A., Schiantarelli, F and Weiss, A. (2007). Does financial reform improve the allocation of investment? Micro evidence from developing countries, *Journal of Development Economics*, 83: 562-587.
- Gallego, F. and Loayza, N. (2001), Financial structure in Chile: Macroeconomic developments and microeconomic effects, in A. Demirgüç-Kunt and R. Levine, Eds., *Financial Structure and Economic Growth*, Cambridge, MA, MIT Press, 299–346.
- Gelos, G., and Werner, A. (2002), Financial liberalization, credit constraints, and collateral: Investment in the Mexican manufacturing sector," Working Paper WP/99/25, IMF.
- Gertler, M. and Rose, A. (1994), Finance, public policy, and growth", in G. Caprio, Atiyas, I. and J. Hanson, Eds., *Financial reform: Theory and experience*, New York, NY, Cambridge University Press.
- Gezici, A. (2007), Investment under financial liberalization: channels of liquidity and uncertainty', PhD Thesis, University of Massachusetts Amherst.
- Ghosh, S. (2006), Did financial liberalization ease financing constraints? Evidence from Indian firm-level data. *Emerging Market Review* 7: 176–190.
- Gilchrist, S. and Himmelberg, C. P. (1995), Evidence on the role of cash flow for investment, *Journal of Monetary Economics* 36: 541-572.
- Guariglia, A. (2008). Internal financial constraints, external financial constraints, and investment choice: Evidence from a panel of UK firms. *Journal of Banking & Finance* 32: 1795-1809.

- Guariglia A, Mateut S. (2006). Credit channel, trade credit channel, and inventory investment: Evidence from a panel of UK firms, *Journal of Banking and Finance* 30: 2835-2856.
- Gupta, N., Yuan, K., (2009). Financial dependence and growth: evidence from stock market liberalizations. *Review of Financial Studies* 22: 4715-4752.
- Harris, J. R., Schiantarelli, F. and Siregar, M. G. (1994), The effect of financial liberalization on the capital structure and investment decisions of Indonesian manufacturing establishments, *World Bank Economic Review* 8: 17–47.
- Henry, P. B. (2000), Do stock market liberalizations cause investment booms?, *Journal of Financial Economics* 58: 301–334.
- Horstmann, I. J., and Markusen, J. R. (1989), Firm-specific assets and the gains from direct foreign investment, *Economica*, 56: 41–48.
- Hoshi, T., Kashyap, A. K. and Scharfstein, D. (1991), Corporate structure liquidity and investment: Evidence from Japanese panel data, *Quarterly Journal of Economics* 106: 33–60.
- Huang, Y. (2003). *Selling China: Foreign Direct Investment during the reform era*. New York: Cambridge University Press.
- Hughes JL, Logue D, and Sweeney R. (1975), Corporate international diversification and market assigned measures of risk and diversification. *J. Financ. Quant. Anal.* 10: 627 – 37.
- Jaramillo, F., Schiantarelli, F. and Weiss, A. (1997). Capital market imperfections, financial constraints and investment: econometric evidence from panel data for Ecuador. *Journal of Development Economics* 51: 367–386.
- Jensen, M. and Meckling, W. (1976), Theory of the firm: managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics* 3: 305–360.
- Jorgenson, D. W. (1963), Capital theory and investment behaviour, *The American Economic Review*, 53: 247-259.
- Kadapakkam, P., Kumar, P. and Riddick, L.A. (1998), The impact of cash flows and firm size on investment: The international evidence, *Journal of Banking & Finance*, 22: 293-320.
- Kaplan, S. N., and Zingales, L. (1997), Do investment-cash flow sensitivities provide useful measures of financing constraints?, *Quarterly Journal of Economics* 112, 169-215.
- Kedia, S. and Mozumdar, A. (2003), Foreign currency-denominated debt: An empirical examination, *Journal of Business*, 76: 521-546.
- Khanna, T., & Palepu, K. (2000), The future of business groups: Long run evidence from Chile. *Academy of Management Journal*, 43: 268-285.

- Khanna, T. and Rivkin, J.W. (2006), Interorganizational ties and business group's boundaries: Evidence from an emerging economy, *Organization Science* 17, 333–352.
- Khanna, T. and Yafeh, Y. (2005), Business groups and risk sharing around the World, *Journal of Business* 78, 301–40.
- Khurana, I. K., Martin, X. and Pereira, R. (2006), Financial development and the cash flow sensitivity of cash, *Journal of Financial and Quantitative Analysis* 41, 787-806.
- King, R. G. and Levine, R. (1993), Finance and growth: Schumpeter might be right, *Quarterly Journal of Economics* 108, 717-737.
- Kong, M. (1998), Stock market development, liquidity constraints and investment: a case of Korean jaebol and non-jaebol manufacturing firms in the 1980. *Asian Economic Journal* 12, 1-22.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R., (1997), Legal determinants of external finance. *Journal of Finance* 52: 1131-1150.
- Laeven, L. (2003), Financial liberalization and financing constraints: evidence from panel data on emerging economies. World Bank Policy Research Working Paper 2467. World Bank, Washington DC.
- Laeven, L. (2002), Financial constraints on investments and credit policy in Korea, *Journal of Asian Economics* 13, 251-269.
- Lee, K., and Kwok, C. (1988), Multinational corporations vs. Domestic corporations: International environmental factors and determinants of capital structure, *Journal of International Business Studies* 19: 195-217.
- Leff, N. (1976), Capital markets in the less developed countries: The group principle. In *Money and Finance in Economic Growth and Development*, McKinnon R (ed.). New York: Marcel Dekker.
- Leland, H. and Pyle, D. (1977), Information Asymmetries, Financial Structure, & Financial Intermediation, *Journal of Finance* 32, 371–388.
- Liu, Q. and A. Siu (2006), Institutions, financial development, and corporate investment: evidence from an implied return on capital in China. Mimeograph, University of Hong Kong.
- Love, I. (2003). Financial development and financing constraints: international evidence from the structural investment model. *Review of Financial Studies* 16, 765–791.
- Manova, K. S-J Wei and Z. Zhang, 2009, “Firm exports and multinational activity under credit constraints”, Stanford university, mimeo.
- Miller, M. H. (1977), Debt and taxes, *Journal of finance* 32, 261-275.

- Modén, K. M. and Oxelheim, L. (1997), Why issue equity abroad? – Corporate efforts and stock market responses, *Management International Review*, 37: 223-241.
- Modigliani, F. and Miller, M. H. (1958), The cost of capital, corporate finance, and the theory of investment, *American Economic Review* 48, 261–297.
- Modigliani, F. and Miller, M. H. (1963), Corporate income, taxes and the cost of capital: A correction, *American Economic Review* 53, 433-443.
- Moore, T. (2009), Large Firms and Soft Budget Constraints for Transition Economies, *Economics and Finance Working Paper Series* 09-12.
- Myers, S. (1984). The capital structure puzzle. *Journal of Finance* 39:575–92
- Myers, S. C. and Majluf N. S. (1984), Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics* 13, 187-221.
- Oliner, S. D. and Rudebusch, G. D. (1992), Sources of the financing hierarchy for business investment, *Review of Economics and Statistics* 74, 643–654.
- Opler, T., Pinkowitz, T., Stulz, R. and Williamson, R., (1999), The determinants and implications of corporate cash holdings. *Journal of Financial Economics* 52, 3-46.
- Poncet, S., Steingress, W. and Vandenbussche, H. (2010), Financial constraints in China: firm-level evidence. *China Economic Review* 21: 411-422.
- Rajan, R. G., and Zingales, L. (1998), Financial Dependence and Growth. *American Economic Review* 88, 559–86.
- Ratti, R., Lee, S. and Seol, Y. (2008). Bank concentration and financial constraints on firm-level investment in Europe, *Journal of Banking & Finance*, 32: 2684-2694.
- Reeb, D.M., Kwok, C.C., Baek, H.Y. (1998), Systematic risk of the multinational corporation. *Journal of International Business Studies* 29, 263–279.
- Robbins, S. M. and Stobaugh, R. B. (1973), The best measuring stick of foreign subsidiaries, *Harvard Business Review*, 51: 80-88.
- Ross S.A. (1977), The determination of financial structure: The incentive-signalling approach, *Bell Journal of Economics*, The RAND Corporation 8, 23-40.
- Schaller, H. (1993), Asymmetric information, liquidity constraints, and Canadian investment, *Canadian Journal of Economics* 26, 552–574.
- Shapiro, A.C. (1978), Capital budgeting for the multinational corporation, *Financial Management* (Spring): 7-16.
- Siregar, M. (1992), Financial liberalization, investment, and debt allocation, unpublished Pd.D. Dissertation, Boston University.

Solnik B (1974), Why not diversify international rather than domestically? *Financial Analyst Journal*, 30: 48-54.

Stiglitz, J. E. and Weiss, A. (1981), Credit rationing in markets with imperfect information. *The American Economic Review* 71, 393-410.

Tolmunen, P., and Torstila, S. (2005), Cross-Listings and M&A Activity: Transatlantic evidence, *Financial Management* 34, 123-142.

Whited, T. (1992), Debt, liquidity constraints, and corporate investment: Evidence from panel data, *Journal of Finance* 47, 1425–1460.

Wurgler, J., (2000), Financial markets and the allocation of capital, *Journal of Financial Economics* 58, 187–214.

Appendix

Do file of estimation

tsset id year

/*Indian investment*/

xtabond2 ik l.ik l.cfk l.sk l.dk if country==1000, gmm (l.ik l.cfk l.dk l.sk, lag (2 2)) iv() nolevel small

xtabond2 ik l.ik l.cfk l.cfkbg l.cfksoe l.sk l.dk if country==1000, gmm (l.ik l.cfk l.cfkbg l.cfksoe l.dk l.sk, lag (2 2)) iv() nolevel small

xtabond2 ik l.ik l.cfk l.cfkbg l.cfksoe l. cfkysr l.flist l.sk l.dk if country==1000, gmm (l.ik l.cfk l.cfkbg l.cfksoe l.dk l.sk l.flist, lag (2 2)) iv() nolevel small

xtabond2 dik l.dik l.cfk l.sk l.dk if country==1000, gmm (l.dik l.cfk l.dk l.sk, lag (2 2)) iv() nolevel small

xtabond2 dik l.dik l.cfk l.cfkbg l.cfksoe l.sk l.dk if country==1000, gmm (l.dik l.cfk l.cfkbg l.cfksoe l.dk l.sk, lag (2 2)) iv() nolevel small

xtabond2 dik l.dik l.cfk l.cfkbg l.cfksoe l. cfkysr l.flist l.sk l.dk if country==1000, gmm (l.dik l.cfk l.cfkbg l.cfksoe l.dk l.sk l.flist, lag (2 2)) iv() nolevel small

xtabond2 fik l.fik l.cfk l.sk l.dk if country==1000, gmm (l.fik l.cfk l.dk l.sk, lag (2 2)) iv() nolevel small

xtabond2 fik l.fik l.cfk l.cfkbg l.cfksoe l.sk l.dk if country==1000, gmm (l.fik l.cfk l.cfkbg l.cfksoe l.dk l.sk, lag (2 2)) iv() nolevel small

xtabond2 fik l.fik l.cfk l.cfkbg l.cfksoe l. cfkysr l.flist l.sk l.dk if country==1000, gmm (l.fik l.cfk l.cfkbg l.cfksoe l.dk l.sk l.flist, lag (2 2)) iv() nolevel small

/*Chinese investment*/

xtabond2 ik l.ik l.cfk l.sk l.dk if country==1001, gmm (l.ik l.cfk l.dk l.sk, lag (2 2)) iv() nolevel small

xtabond2 ik l.ik l.cfk l.cfkg l.cfksoe l.sk l.dk if country==1001, gmm (l.ik l.cfk l.cfkg l.cfksoe l.dk l.sk, lag (2 2)) iv() nolevel small

xtabond2 ik l.ik l.cfk l.cfkg l.cfksoe l. cfkysr l.flist l.sk l.dk if country==1001, gmm (l.ik l.cfk l.cfkg l.cfksoe l.dk l.sk l.flist, lag (2 2)) iv() nolevel small

xtabond2 dik l.dik l.cfk l.sk l.dk if country==1001, gmm (l.dik l.cfk l.dk l.sk, lag (2 2)) iv() nolevel small

xtabond2 dik l.dik l.cfk l.cfkg l.cfksoe l.sk l.dk if country==1001, gmm (l.dik l.cfk l.cfkg l.cfksoe l.dk l.sk, lag (2 2)) iv() nolevel small

xtabond2 dik l.dik l.cfk l.cfkg l.cfksoe l. cfkysr l.flist l.sk l.dk if country==1001, gmm (l.dik l.cfk l.cfkg l.cfksoe l.dk l.sk l.flist, lag (2 2)) iv() nolevel small

xtabond2 fik l.fik l.cfk l.sk l.dk if country==1001, gmm (l.fik l.cfk l.dk l.sk, lag (2 2)) iv() nolevel small

xtabond2 fik l.fik l.cfk l.cfkg l.cfksoe l.sk l.dk if country==1001, gmm (l.fik l.cfk l.cfkg l.cfksoe l.dk l.sk, lag (2 2)) iv() nolevel small

xtabond2 fik l.fik l.cfk l.cfkg l.cfksoe l. cfkysr l.flist l.sk l.dk if country==1001, gmm (l.fik l.cfk l.cfkg l.cfksoe l.dk l.sk l.flist, lag (2 2)) iv() nolevel small